Creativity in Military Institutions, its Impact and Significance

Case of the Antigua and Barbuda Defence Force (ABDF)

by

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BIOGRAPHY

Shereka Rashedah Kerdisha Jackson was born in Antigua on the 29th day of November 1983 and is the eldest child for both parents. She currently resides in Portugal, in the city of Porto, and is a student on her way to completing the Master in Management (MIM) at the University of Porto, Faculty of Economics.

Her most recent academic achievements include a Bachelor of Science (BSc.) in Management Studies, with First Class Honours, obtained from The University of the West Indies (UWI), Open Campus Antigua, and was awarded in the year 2011. She also holds a college diploma from the Antigua State College which was awarded in the year 2002.

Ms. Jackson undertook employment with the Government of Antigua and Barbuda as a Civil Servant in March 2003, and was attached to the Antigua and Barbuda Defence Force, Finance Department as a Junior Clerk. In a relatively short period, she gained recognition for her outstanding work by her co-workers and heads of government departments and was promoted to the position of Senior Clerk, then subsequently to Assistant Secretary, the post she currently holds in the same department today.

She considers herself a conscientious, dedicated and disciplined individual with a positive outlook on life. Her ultimate career goal is to become a budget analyst and these characteristics will enable her to achieve her dream in the near future. Ms. Jackson is by no means a one dimensional person so her interests outside of academics include reading, walking, dancing, travelling and meeting new people. She is bilingual, speaking Spanish as a second language, and hopes to gain further qualifications in the language of Portuguese. Ms. Jackson is an active member of The University of the West Indies Alumni Association (UWIAA), Antigua and Barbuda Chapter, which is a non-profit organization geared towards activities that support UWI in the areas of student recruitment, career networking, mentoring and fund-raising.

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ABSTRACT

Creativity is a widely studied area and evidence from the literature shows that bureaucratic, mechanistic or rigid organizations tend to have very low levels of creativity, while adaptive organizations tend to have higher levels of creativity. To our best knowledge, the use and relevance of creativity in bureaucratic structures have been relatively understudied creating a gap in the literature.

This study seeks to examine creativity within the military of the Antigua and Barbuda Defence Force (ABDF), to gain an understanding of the forces driving or impeding creativity. As we live in a constantly changing environment, some past research on creativity in mechanistic structures might be antiquated and this study will seek to highlight those areas. The study seeks to assess the level of creativity by assessing the climate for creativity and the frequency and acceptance of creative outputs; it further seeks to uncover how creativity is distributed across the organizational hierarchy and to determine if individual creativity is a mediator between the climate and creative output.

This research employed a case study and quantitative approach, and data was gathered from the officers within the organization via a survey. A number of statistical tests were performed including correlation, regression and mediation analyses and it was found that the level of creativity within the institution is moderate and that the middle management group came up with the most creative outputs in terms of generation and acceptance. Moreover, the perceived climate is positively related with creative outputs and individual creativity was found to be a mediator between the climate and creative output. The findings of this study can be used as a benchmark for assessing creativity within other military institutions and mechanistic structures and can aid in theory building. Additionally, this research highlights some areas that management needs to consider in order to improve creativity within the organization.

Key-Words: Creativity and Innovation, Organizational Climate, Military Institution, Organizational Hierarchy, Creative Output

RESUMO

A criatividade é uma área amplamente estudada e a evidência da literatura mostra que organizações burocráticas, mecanicistas ou rígidas têm tendência a ter níveis muito baixos de criatividade, enquanto as organizações adaptativas têm tendência a ter níveis mais altos de criatividade. Segundo o nosso melhor conhecimento, o uso e a relevância da criatividade em estruturas burocráticas têm sido relativamente pouco estudados, o que representa uma lacuna na literatura.

Este estudo pretende conhecer a criatividade na organização militar Força de Defesa de Antígua e Barbuda (FDAB) para obter uma compreensão das forças que impulsionam ou impedem a criatividade. Como vivemos num ambiente em constante mudança, algumas pesquisas anteriores sobre criatividade em estruturas mecanicistas pode ser antiquada, pelo que este estudo procurará atualizar estas áreas. O estudo procura avaliar o nível de criatividade, avaliando o clima para a criatividade e a frequência e aceitação de *outputs* criativos; procura ainda descobrir como a criatividade é distribuída através da hierarquia organizacional e determinar se a criatividade individual é um mediador entre o clima e produção ou output criativo.

Esta pesquisa utilizou o estudo de caso e a abordagem quantitativa, sendo os dados recolhidos a partir dos oficiais da organização através de um inquérito. Uma série de testes estatísticos foram realizados incluindo a correlação, a regressão e a mediação e verificou-se que o nível de criatividade dentro da instituição é moderado e que o grupo da gestão intermédia se apresenta como o mais criativo em termos de geração e aceitação de ideias/*outputs*. Além disso, o clima percebido está positivamente relacionado com *outputs* criativos e a criatividade individual revelou ser um mediador entre o clima e produção criativa. Os resultados deste estudo podem ser usados como referência para a avaliação da criatividade dentro de outras instituições militares e estruturas mecanicistas e pode ajudar na construção de teoria. Além disso, esta pesquisa destaca algumas áreas da

gestão que precisam ser consideradas a fim de melhorar a criatividade dentro da organização.

Palavras-Chave: Criatividade e Inovação, Clima Organizacional, Instituição Militar, Hierarquia Organizacional, *Output* criativo

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CHAPTER 1 - INTRODUCTION

Creativity is evident within many different fields and when one hears the term creativity, one tends to associate it with art and science. However, it is not limited to art and science. Creativity is also exhibited in the areas of social policy, education and business and has been used widely in many studies concerning personality, motivation, cognition, neuroscience and emotional subjects. Hence, one can see the scope of the applicability of creativity. Vego (2013) notes that "in the public mind, creativity is associated with the works of famous painters, sculptors, musicians, philosophers and scientists, but not of those in the military" (p. 83). Though the military organization is a bureaucratic institution, it is believed that it does have some level of creativity within its structure. Every human being, and probably every organization, has some creative potential, although some may be more creative than others.

Hacker (1993) states that "military institutions are species of social institutions, patterned social relationships between individuals and groups that organize and control the achievement of enduring social purposes. The social purposes they serve center on wielding coercive force toward several ends: warding off external threats, seizing resources, quelling internal dissent" (p. 1). The use of the term military institution is synonymous with the terms bureaucratic, mechanistic or rigid structures characterized by: high specialization; high formalization; rigid departmentalization, clear chain of command; narrow span of control and centralization (Moorhead and Griffin, 1995).

There are a number of scholars who have come up with definitions of creativity to include Daniel (1993), Amabile, Conti, Coon, Lazenby and Herron (1996), Csikszentmihalyi (1996) and Sternberg and Lubart (1999). There is a consensus within the scholarly literature as to the definition of creativity with most focusing on the novelty and usefulness of ideas. This study will focus on organizational creativity which is the generation of valuable new ideas, services, procedures or processes within an organization.

Examining the literature review on creativity reveals that organizational structures that are bureaucratic, mechanistic, or rigid, tend to have very low levels of creativity while those that are of a matrix form or more organic, tend to foster creativity. Woodman (1995) notes that "in general, adaptive organizational forms (e.g. matrix, networks, collateral, or parallel structures) increase the odds for creativity. Bureaucratic, mechanistic or rigid structures decrease the probability of organizational creativity" (p. 64). However, within the literature, there are very limited studies that have been conducted to examine the potential and driving forces for creativity within mechanistic structures, especially within a military institution. A large body of the literature (Burns and Stalker, 1961; Burnside, 1990; Payne, 1991; Woodman, 1995; Ahmed, 1998) focuses on the characteristics of mechanistic structures that impede creativity, generating a gap in the research community on the role and use of creativity in these very structures themselves.

With the rapid proliferation of advanced communication technologies, global competition and a constantly changing environment, mechanistic structures are adapting creative techniques in order to increase organizational proficiency. Eisenberger, Fasolo and Davis-LaMastro (1990) state that some organizations that are quite stable and operate within environments that are fairly predictable can gain from creative ideas that can improve quality, productivity, safety, or employee satisfaction. Hence, it can be deduced that there is considerable room for mechanistic structures to encompass more creativity within their structures.

It is likely that a lot of the literature surrounding creativity in mechanistic structures runs the risk of being skewed, focusing on the elements that impede creativity. Also, with a constantly changing environment, some of the findings of past research on creativity in mechanistic structures might be antiquated. Further, there are limited studies that have emerged that concentrate on the importance and use of creativity within bureaucratic organizations, more so, military organizations. DiLiello and Houghton (2008) conducted a study in the United States on 693 army employees that examined the construct validity between creative potential and practiced creativity. Also, Raudeliūnienė, Meidutė and

Giedrius (2012) examined the evaluation system and factors affecting creativity in the Lithuanian Armed Forces which focused on two structural military units.

Nowadays, it appears that there is an inclination towards mechanistic structures embracing creativity to increase organizational proficiency. A number of scholars to include Eisenberger et al. (1990) have suggested this trend. Janowitz (1959) notes that "as organizational forms have grown more complex, bureaucratic authority has tended to be transformed" (p. 474). It is our view that this transformation has opened up an avenue for mechanistic structures to absorb more creativity within their organization. It has been stated quite frequently within the literature that bureaucratic organizations are becoming less effective and do not fit with contemporary realities. A few scholars see the complete removal of bureaucracy and the creation of an alternative organizational form as necessary in the future (Bennis, 1966; Agrawal, 2013). If this were indeed the case, then one would expect these organizational forms to be making at least slight changes within their structures in order to adapt to the changing environment. Creativity is likely to be in the process of this adaptation.

There is a huge gap within the literature of empirical work focusing on organizational creativity within a military organization with specific emphasis on examining the level or frequency of creative outcomes. The limited knowledge of research in this area prompted the investigation of creativity within a military institution, an institution that can be characterized as one of the most mechanistic structures that exist in all forms and has often been considered as a prototype to bureaucracy. Having over twelve (12) years of experience working at a military institution in the area of administration, seeing firsthand the operations of the military and interacting with different ranks of military personnel on a day-to-day basis, the researcher has seen creative elements within the institution, or at least changes, such as but not limited to: new training methods and programs; development of a task force geared towards combating the increased level of crime within the nation; new procedures and processes aimed at improving the security of the nation, and productivity and efficiency within the organization itself; development and implementation of a new information and payroll system.

Prima facie, one would tend to draw the conclusion that creativity, especially organizational creativity, does not exist within a military institution because of the rigid structure of the organization itself (strict chain of command and rules and regulations). However, as different departments have to compete for government's scarce resources, it drives them to be creative and innovative in order to obtain the most of those scarce resources, including the military. It is impracticable for organizations to thrive without some form of creativity within their environment. Organizations with less creative tendencies are likely to lag behind in growth, efficiency and success in comparison to those organizations that are open to creativity. Vego (2013) accentuates that "the success in a military domain in both peacetime and in war is hardly possible without considerable creativity on the part of the military institution as a whole and their commanders and staffs at all levels" (p. 83). DiLiello and Houghton (2008), note that the United States Department of Defence is an example of an organization that acknowledges the importance of leveraging the creativity of workforce members in order to transform its culture and business practices. The researchers note that the organization's ability to fulfill its mission of averting enemy terrorization, depends in large part on the extent to which it can develop new capabilities. One can therefore realize the importance and role of creativity within military institutions. Further, they state that the organization has acknowledged the importance of change within the military and supporting organizations.

Nonaka (1991), in his Harvard Business Review article on the Matsushita Electric Company, notes that at an organizational level, creativity is synonymous with knowledge creation which enables organizations to be flexible and to be able to respond quickly to changing environmental conditions or customer demands. He states that, as has been frequently cited within the literature, to some degree, every job allows a certain level of creativity and when there is a fit or match between individuals who possess creativity relevant skills and an environment that is supportive of trying new things, creativity, along with positive outcomes (at all levels of analysis) will ensue.

Additionally, one must take into account the personality of the members within the military. Despite having to follow the rules and regulations of the institution, these individuals have

their unique personal characteristics that can aid creativity within their environment. The level of creativity within the military will depend on the organization's structure, culture or climate, nature of the work performed and the creative potential of the employees themselves and can have an impact on the organization as a whole.

Shalley, Gilson and Blum (2000) advocate that creativity within a work context is likely to occur in any type of work or career or by any employee, once the appropriate conditions for creativity are met. Further, Williams (2004) notes that "when inclined and permitted to do so, individuals with routine jobs can think beyond established approaches and think divergently about different methods and outputs, and this creative activity can lead to valuable innovation" (p. 188). This research will examine the level or intensity of organizational creativity by evaluating the climate and creative outputs.

Climate is commonly held to be reflected in peoples' perceptions of, or beliefs about, environmental attributes or norms, shaping expectations about outcomes, contingencies, requirements, behaviours and interactions in the work environment (Schneider and Reichers, 1983; James, James and Ashe, 1990; Parker, Baltes, Young, Huff, Altmann, Lacost and Roberts, 2003). In other words, climate is inferred by the members of the organization, through the practices, procedures and reward systems deployed by the organization and is indicative of the way the organization manages itself on a daily basis (Ahmed, 1998). Schneider, Gunnarson and Niles-Jolly (1994) identify four dimensions of climate that are known to shape the organization, namely, nature of interpersonal relationships, nature of hierarchy, nature of work and focus of support and rewards (p. 31). These dimensions will be assessed in this study in order to make a determination of the climate within the Antigua and Barbuda Defence Force (ABDF). Many research have been conducted to examine the relationship of climate and creativity and there is evidence that organizational climate does influence creativity within organizations (Damanpour, 1991; Amabile et al., 1996; Ekvall, 1996; Oldham and Cummings, 1996; Tesluk, Farr and Klein, 1997; Isaksen, Lauer, Ekvall and Britz, 2000; Andriopoulos, 2001; Hunter, Bedell and Mumford, 2007; Isaksen and Akkermans, 2011).

Creativity is also determined or measured by creative outputs or outcomes. Creative outputs are the generation or creation of a new product, service, idea, process, or procedure that is useful. It has been argued that creativity can occur in any job. However, the creative processes and outcomes can range from minor adaptations to major breakthroughs (Kirton, 1976; Shalley et al., 2000; Unsworth, 2001). Innovation is the successful implementation of novel and appropriate ideas within an organization (Amabile, 1997). Hence, innovative outputs (products, services, ideas, processes, or procedures) are also used as a measure of creativity. Other outcome measures include awards and honours for creativity, specific creative achievements and creative performance. This research will make a determination as to the level of creativity based on the submission of ideas to the organization, focusing on the frequency and acceptance of the creative ideas submitted.

This research will ascertain the level of creativity within the ABDF by examining the climate, individual creative abilities and creative outputs. As there is supporting evidence that organizational climate does influence creativity, evaluating the climate will enable a determination to be made on creativity within the institution. Analyzing the level of creativity will have to be based on the perceptions of the climate and the creation of useful new services, ideas, procedures, or processes and not on the creation of new products since the ABDF is not in the business of producing tangible products. Its main aim is to provide national security services to the nation of Antigua and Barbuda. **Annex 1** provides a brief background of the ABDF.

This research aims to examine creativity within a military institution, specifically, the Antigua and Barbuda Defence Force (ABDF), providing significant insights into the forces or factors driving or impeding creativity within the ABDF. It seeks to answer the following questions:

1. How supportive is the climate at the ABDF towards organizational creativity?
2. Where is creativity emphasized most within the organizational hierarchy?
3. Is a creative work environment (or climate) related with individual creativity and creative output?

At the completion of the research, the writers expect to produce a solid work that can add to the limited body of the literature on creativity in mechanistic structures, and more specifically, within a military institution. It is our hope that further work and testing be carried out on this particular issue to include other military institutions within the Caribbean region and internationally and other bureaucratic forms of organization to provide insights into the importance of creativity within these organizational forms.

CHAPTER 2 - LITERATURE REVIEW

2.1 Individual and Organizational Creativity

There are a number of scholars who have come up with definitions of creativity to include Daniel (1993), Amabile et al., (1996), Csikszentmihalyi (1996) and Sternberg and Lubart (1999) (see **Table 1**). There is a consensus within the scholarly literature as to the definition of creativity with most focusing on the novelty and usefulness of ideas. The definition of creativity that will be used in this study is by Amabile et al. (1996) who define creativity as "the production of novel and useful ideas in any domain" (p. 1155).

It is possible to distinguish between individual creativity and organizational creativity. In simple terms, individual creativity is the ability of an individual to be creative (to produce ideas that are novel and useful). Woodman, Sawyer and Griffin (1993) state that individual creativity is the complex product or output of a person's behaviour in a given situation. Individual creativity is often presented as an essential component for facilitating organizational innovation (Amabile, 1988; Woodman et al., 1993). Individual creative behaviour is a function of antecedent conditions, personality, knowledge, intrinsic motivation, cognitive styles and abilities, social influences and contextual influences (Woodman et al., 1993). It is essential to consider individual creativity in examining the level of creativity within an organization as individual creativity is the basis for both team and organizational creativity.

Woodman (1995) defines organizational creativity as follows: "the creation of a valuable, useful new product, service, idea, procedure, or process by individuals working within a complex social organization" (p. 293). This definition will be adopted throughout this study. Van Gundy (1987) defines organizational creativity as the sum of creative traits, abilities and actions of all the organization's members. Since the ABDF is not an organization that produces tangible products for sale, analyzing the level of creativity will have to be based on the creation of useful new services, ideas, procedures, or processes. Hence, this definition is most appropriate for this research as it encapsulates some of the

most important variables that have been used to assess the level of creativity within organizations.

Table 1 - Definitions of Creativity and Innovation

Concept	Definition	Author and Year
Creativity	A mental process involving the generation of new ideas and concepts, or new associations between existing ideas and concepts in order to produce something deemed useful by field and /or peers.	Csikszentmihalyi (1996)
	The ability to produce work that is both novel and appropriate.	Sternberg and Lubart (1999)
	The complex product of a person's behaviour in a given situation.	Woodman and Shoenfeldt (1989, 1990)
	One's ability to bring something new into existence _ to generate novel ideas that are valued by others. It involves one's ability to properly evaluate and present already existing ideas or processes in a different way.	Daniel (1993)
Innovation	The successful implementation of novel and appropriate ideas within an organization.	Amabile (1997)
	The intentional introduction and application within a role, group or organization of ideas, processes, products or procedures, new to the relevant unit of adoption, designed to significantly benefit role performance, the group, the organization or the wider society.	West and Farr (1989)
	The design, invention, development and/or implementation of new or altered products, services, processes, systems, organizational structures, or business models for the purpose of creating new value for customers and financial returns for the firm.	The Advisory Committee on Measuring Innovation in the 21st Century Economy (2008)
	Innovation is generally understood as the introduction of a new thing or method. Innovation is the embodiment, combination, or synthesis of knowledge in original, relevant, valued new products, processes, or services.	Luecke and Katz (2003)

2.2 Factors Influencing Organizational Creativity

2.2.1 Organizational Factors

Research has been performed to determine factors that influence creativity at an organizational level. Organizational factors such as cultural influences, resources available, reward policies, organizational mission, organizational strategy, organizational structure and technology are the most common influences. Although their effects are difficult to measure, the extent of their presence are all positively related to creativity in organizations (Burkhardt and Brass, 1990; Woodman et al., 1993; Paulus, 2000).

According to Andriopoulos (2001), the dimensions of organizational climate, organizational culture, organizational structure and systems[1], leadership style and resources and skills, are the major organizational dimensions that can enhance or inhibit creativity in a work environment.

Within the scholarly literature, many studies on climate have been done to examine the relationship between organizational climate and creativity (Damanpour, 1991; Amabile et al., 1996; Ekvall, 1996; Oldham and Cummings, 1996; Tesluk et al., 1997; Isaksen et al., 2000; Andriopoulos, 2001; Hunter et al., 2007; Isaksen and Akkermans, 2011; Yee, Pink and Sern, 2014). The major findings of these studies show generally that the more supportive the climate is for creativity, the higher the creativity and vice versa. Mathisen and Einarsen (2004) state that climate studies examine peoples' perceptions of, or experiences in their immediate work environment with respect to dimensions such as support and autonomy. Hunter et al. (2007) advocate that the results obtained in these studies underscore the importance of climate in that:

(a) creative people (people evidencing the individual attributes related to creative achievement) appear especially reactive to climate variables (Oldham and Cummings, 1996);

(b) climate perceptions, at both individual and group level, have been found to be effective predictors of creativity and innovation in organizations (Tesluk et al., 1997);

(c) and climate assessments have provided a basis for organizational interventions that have proven useful in enhancing creativity and innovation (Van de Ven 1986; Schneider et al., 1994; and Basadur, 1997).

Evidence compiled by Mathisen and Einarson (2004) indicated that climate measures can predict creativity and innovation in real-world settings. Hence, it is essential to assess the climate at the ABDF in order to predict organizational creativity. The above authors further

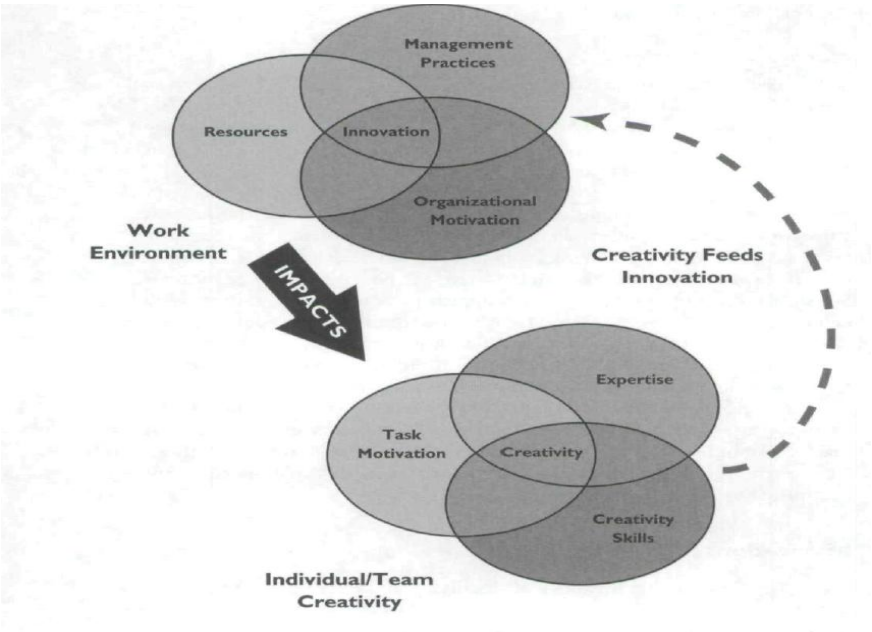
[1] Organizational structure and systems might best be described as the framework around, and the systems that support, the work being done in an organization (Andriopoulos, 2001).

note that all of the dimensions commonly established in climate studies produced sizeable effects with respect to measures of creativity and innovation.

The Componential Theory developed by Amabile (1997) is a very popular model that is used in creativity research. The aim of the theory is to adequately capture all of the major elements influencing creativity and innovation within organizations. It is a comprehensive model of the social and psychological components necessary for an individual to produce creative work and follows a motivational approach. Amabile (1997) notes that the Componential Theory of Creativity assumes that all humans with normal capacities are able to produce at least moderately creative work in some domain, some of the time _ and that the social environment (the work environment) can influence both the level and frequency of creative behaviour. The theory is broken down into two components: organizational creativity and innovation and individual creativity and innovation. The component of organizational creativity and innovation will be discussed first.

Amabile (1997) states: "The central prediction of the Componential Theory of Organizational Creativity and Innovation is that elements of the work environment will impact individuals' creativity. The theory also proposes that the creativity produced by individuals and teams serves as a primary source for innovation within the organization. The most important feature of the theory is the assertion that the social environment (the work environment) influences creativity by influencing the individual components" (p. 52). See **Figure 1**.

Figure 1 - Impact of the Organizational Environment on Creativity



Source: Amabile (1997)

The three conceptual categories of this theory regarding the work environment are:

(1) Organizational motivation to innovate - which is made up of the basic orientation of the organization towards innovation, as well as supports for creativity and innovation throughout the organization. According to Amabile (1997), the orientation toward innovation must come, primarily, from the highest levels of management, but lower levels can also be important in communicating and interpreting that vision.

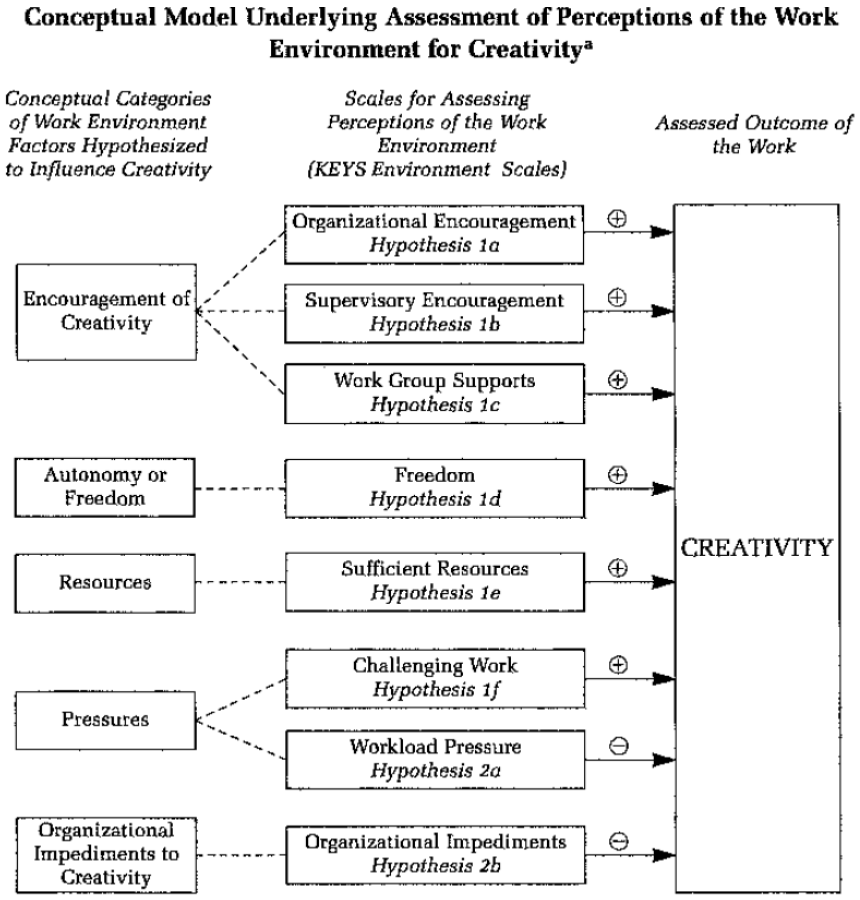
(2) Resources - this includes everything that the organization has to aid work in the domain targeted for innovation.

(3) Management practices - this includes management at all levels, but most especially the level of individual departments and projects. Amabile (1997) further notes that several earlier researchers and theorists have suggested that creativity and innovation are fostered by allowing a considerable degree of freedom or autonomy in the conduct of one's work.

Amabile et al. (1996) developed an instrument called KEYS which is used to assess the work environment for creativity. They note that the conceptual model underlying the development of KEYS is a more detailed and specific articulation of this componential theory.

The conceptual categories presented in **Figure 2** were developed from two primary sources. The first was a review of previous research. The second was a critical-incidents study in which 120 R&D scientists and technicians were asked to describe a high-creativity event from their work experience as well as a contrasting low-creativity event (Amabile and Gryskiewicz, 1987; Amabile, 1988).

Figure 2 - Antecedents of Individual and Organizational Creativity



Source: Amabile et al. (1996)

The conceptual categories of Amabile et al. (1996) and related theoretical contributions from other authors are described below:

Encouragement for creativity - this dimension is by far, the broadest and most frequently mentioned in the literature. Encouragement of the generation and development of new ideas appears to operate at three major levels within organizations. The first of these which is organizational encouragement, appears prominently within the literature (Kimberley and Evanisko, 1981; Kanter, 1983; Delbecq and Mills, 1985). An aspect of organizational encouragement is the allowance of risk-taking and idea generation, a valuing of innovation from the highest to the lowest levels of management. Psychological research on creativity has proven that people are more likely to produce unusual, useful ideas if they are given license to do so by the situation or by explicit instructions (Parns and Meadow, 1959; Parns, 1964). Ekvall (1996) and Plesk and Bevan (2003) also identify risk-taking as an important dimension.

Another aspect is the fair and supportive evaluation of new ideas (Kanter, 1983). A highly critical, unfair and threatening environment is not conducive to creativity. Deci and Ryan (1985) note that field experiments have demonstrated that organizations that are supportive to their employees and practice informative evaluation can enhance the intrinsically motivated state that is most favourable to creativity. Rewards and recognition of creativity and a collaborative idea flow across the organization and participative management and decision making are important aspects of organizational encouragement. In terms of rewards, Plesk and Bevan (2003) identify the dimension of reward systems which measures the degree to which the organization rewards the efforts of creative or innovative individuals and teams based on things that the members within the organization value. Further, Plesk and Bevan (2003) pinpoint tools and techniques as a dimension of organizational support or encouragement. This dimension evaluates the degree to which the organization supports a conscious process and method for innovation that is not so restrictive as to stifle creativity.

The other two, supervisory encouragement and work group encouragement are less frequently mentioned within the literature. A few studies have focused on the role of project managers or direct supervisors in the areas of goal setting (Bailyn, 1985), open interactions between supervisors and subordinates (Kimberley and Evanisko, 1981) and supervisory support of team's work and ideas (Delbecq and Mills, 1985). According to Amabile (1979, 1983), an organization that has open supervisory interactions and perceived supervisory support is likely to operate on creativity in a huge way through the same mechanisms that are associated with fair, supportive evaluation; in these cases, persons are less likely to be criticized which can negatively impact on intrinsic motivation necessary for creativity.

Encouragement of creativity can occur in work groups through diversity of the background of the members within the group, mutual openness to ideas, constructive challenging of ideas and shared commitment to the task (Payne, 1990). This working atmosphere can enhance creativity as the diverse background of the members and the mutual openness to ideas can be an enhancer for developing new ideas. Moreover, organizations that can easily form high-performing teams and networks of intrinsically motivated individuals are likely to generate creative teams (Plesk and Bevan, 2003).

Freedom/Autonomy - Amabile et al. (1996) and other researchers (Pelz and Andrews, 1966; Paolillo and Brown, 1978; Bailyn, 1985; King and West, 1985; West, 1986) have concluded that creativity is fostered when individuals and teams have relatively high autonomy in the day-to-day conduct of the work and a sense of ownership and control over their own work and own ideas. Studies of creativity have revealed that individuals produce more creative work when they perceive themselves to have a choice in how to go about accomplishing the task that they are given (Amabile and Gitomer, 1984).

Resources - a number of researchers have suggested that resource allocation to projects is directly related to the projects' creativity levels (Kanter, 1983; Delbecq and Mills, 1985; Cohen and Levinthal, 1990; Farr and Ford, 1990; Payne, 1990; Tushman and Nelson 1990; Damanpour, 1991; Plesk and Bevan, 2003). Aside from the obvious practical limitations that extreme resource restrictions place on what people can accomplish in their work,

perceptions of the adequacy of resources may affect people psychologically by leading to beliefs about the intrinsic value of the projects that they have undertaken.

Further, it is important to note the effect of **training** on creativity. Scott, Leritz and Mumford (2004) conducted a review of the literature on creative training and found that "creativity training works" (p. 382). The researchers conducted a meta-analysis on 70 studies and found that across populations, settings, cognitive levels and participant demographics, good-designed and delivered creativity training was positively related to divergent thinking, problem solving, performance, attitudes and behaviours. There is significant evidence to prove that persons can be trained to be creative.

Pressures - existing evidence suggest paradoxical influences of pressure on creativity in organizations. Some research has found that, although workload pressures that were considered extreme could undermine creativity, some degree of pressure could have a positive influence if it is perceived as arising from the urgent, intellectually challenging nature of the problem itself (Amabile and Gryskiewicz, 1987; Amabile, 1988). Similarly, Andrews and Farris (1972) found that time pressure is generally associated with high creativity in R&D scientists, except when that pressure reaches an undesirable level. Amabile et al. (1996) conceptualize these findings as identifying two distinct forms of pressure, excessive workload pressure and challenge, in which the first should have a negative influence on creativity while the second should have a positive influence.

Organizational impediments to creativity - some research suggest that internal strife, conservatism and rigid formal management structures within organizations will impede creativity (Kimberley, 1981; Kimberley and Evanisko, 1981). Because individuals are likely to perceive each of these factors as controlling, they may lead to increases in individuals' extrinsic motivation, and corresponding decreases in intrinsic motivation that is necessary for creativity (Deci and Ryan, 1985; Amabile, 1988).

Ekvall and his colleagues (Ekvall, 1996; Ekvall and Ryhammer, 1999; Isaksen et al., 2001; Isaksen and Lauer, 2002) proposed a dispositional model of creativity at the workplace that is based on a theory of underlying psychological processes. The authors developed a nine

dimension model: challenge and involvement; freedom; trust and openness; idea time; playfulness and humor; conflict; idea support; debate; risk-taking explained in **Table 2**.

Table 2 - The Nine Dimensions of Organizational Climate

SOQ Dimensions	High Level Definition
Challenge/Involvement	The degree to which people are involved in daily operations, long-term goals, and visions. High Challenge/Involvement implies better levels of engagement, commitment, and motivation.
Freedom	The degree of independence shown by the people in the organization. High levels of Freedom imply more perceived autonomy and ability for individual discretion.
Trust/Openness	The emotional safety in relationships. In high Trust/Openness situations people feel more comfortable sharing ideas and being frank and honest with each other.
Idea-Time	The amount of time people can, and do, use for elaborating new ideas. When Idea-Time is high people can explore and develop new ideas that may not have been included in the original task.
Playfulness/Humor	The spontaneity and ease displayed within the workplace. Good-natured joking and laughter and a relaxed atmosphere (lower stress) are indicators of higher levels of Playfulness and Humor.
Conflict	The presence of personal and emotional tensions (a negative dimension – in contrast to the debate dimension). When Conflict is high people engage in interpersonal warfare, slander and gossip, and even plot against each other.
Idea-Support	The way new ideas are treated. In a high Idea-Support situation people receive ideas and suggestions in an attentive and professional manner. People listen generously to each other.
Debate	The occurrence and open disagreement between viewpoints, ideas, experiences, and knowledge. In the Debating situation many different voices and points of view are exchanged and encouraged.
Risk-Taking	The tolerance of uncertainty and ambiguity. In a high Risk-Taking climate people can make decisions even when they do not have certainty and all the information desired. People can and do "go out on a limb" to put new ideas forward.

Source: Ekvall (1996)

The greater the degree of the dimensions of challenge and involvement, freedom, trust and openness, idea time, playfulness and humor, idea support, debate and risk-taking, the more supportive the climate is to creativity. Conflict is presumed to have a negative effect on creativity. In other words, organizations that have high levels of conflict will likely experience low creative outcomes. Individuals' perceptions of these dimensions provide the indication as to how supportive the climate is for creativity. This Model is very similar to Amabile's Componential Theory of Organizational Creativity. It further adds the

dimensions of involvement, trust and openness, idea time, playfulness and humor and debates.

Plesk and Bevan (2003) note the importance of how knowledge is transmitted within organizations, as this can have an impact on organizational creativity. They identified a dimension of widely shared knowledge which measures the degree to which tacit and explicit knowledge is widely collected (both from the internal and external environment), easily accessible, rapidly transmitted and communicated in a truthful way throughout the organization. The higher the dimension, the higher the likelihood of organizational creativity.

Additionally, Plesk and Bevan (2003) denote specific targets as a dimension that can affect the culture or climate of the organization. This dimension looks at the degree to which the formal leaders make it clear or known that creativity and innovation are highly desired in certain specific areas that are strategically or operationally important to the organization. This is very important and can motivate employees to be focused on the specific target or goal that should be achieved. Once they know that creativity and innovation are highly desired, the members of the organization would likely be motivated to be creative and innovative, especially if rewards are attached.

Similar to Amabile's rationale for developing the Componential Theory of Organizational Creativity and Innovation, Woodman et al. (1993), took a similar approach on creativity. The model, which supposes an interactionist approach, shows that creative behaviour within organizations is a function of two categories of work environment inputs:

1. Group or team characteristics - which are the group norms, cohesiveness, size, diversity, roles, tasks, characteristics and problem-solving approaches used in the group.

2. Organizational characteristics - which consist of organizational culture, resources, rewards, strategy, structure and focus on technology.

The interactionist model of Woodman et al. (1993) provides an integrating framework that combines important elements of personality, cognitive and social psychology explanations of creativity with these two categories of work environment inputs.

The theory of the organization affect-creativity cycle developed by Amabile, Barsade, Mueller and Staw (2005), states that diverse influences, at any point in time, can start a dynamic pattern of increasingly or decreasingly positive affect on creativity. The influences may be comprised of activities provoked by the organization, changes in emotional status and the social environment and the effects of the creative outcome. Amabile et al. (2005) further state that not only are the direct consequences of affect on creativity and vice versa taken into account, but the processes in which affect functions as a concomitant or direct/or indirect effect of creative thinking. Hence, one can clearly see that creativity can be influenced by many factors to include changes within the organization, the emotional state of the individual at a particular point in time and the social environment in which the individual operates.

2.2.2 Team Climate

Creativity has been assessed at a group or team level and evidently, there are characteristics within the group that can affect creativity. Choi and Thompson (2005) note that open groups with rotating group subsets were more creative than closed groups; the open groups produced more ideas and of a greater variety of idea types than did closed groups. However, Woodman et al. (1993) and Perry-Smith (2006) suggested that in some cases, strong group cohesiveness suppresses creativity, whereas weak ties can facilitate it.

Mathisen, Einarsen, Jørstad and Brønnick (2004) note that the model of team climate for creativity and innovation that is cited frequently within the literature is that of West (1990). West (1990) identified four climate factors that are necessary for creativity and innovation to occur in teams which are: vision, participative safety, task orientation and support for innovation. In order for a team to exercise or practice creativity and innovation, it must have a vision that is clearly defined and shared with members, that provides necessary focus and direction to the members' energy. Participation in decision making is necessary

to increase the level of commitment and the likelihood that team members invest in the outcomes of decisions. Moreover, it is important for the environment to be felt as safe by the team members in order to enable them to offer new ideas without the fear of criticism or being ridicule. Creative and innovative performances require team members to critically analyze their tasks, objectives, strategies and processes, to have a preoccupation on continuous improvements. Perceived support for creativity and innovation is important for both processes to actually take place.

The literature as reviewed by others (Mumford, Scott, Gaddis and Strange, 2002) has clearly documented the importance of perceived leader support for team member creativity. Studies have also demonstrated that team member's collective view of support from their leader is directly linked to the team's success in creative endeavours (Amabile et al., 1996). Leadership, though, can be more or less creative in different ways (Sternberg, Kaufman and Pretz, 2003). Further, Sternberg et al. (2003) advocate that the type of creativity that will be present within an organization will be dependent on the leaders and the particular team climate.

Further, Reiter-Palmon and Illies (2004) note that it is very difficult to find high creative outcomes within an organization without considerable support from the team itself and the leaders found within it. Thamain (2003) achieved similar results in his study that showed a significant impact of managerial style on creativity which impacted on organizational innovation. He has found evidence that the specific characteristics of leader-member exchange (LMX) influence the creativity of subordinates. Scott and Bruce (1994) studied 238 knowledge workers from 26 project teams in high-technology firms and found quite a number of positive aspects of LMX including monitoring, clarifying and consulting, but also simultaneously found that the frequency of negative LMX were as high as the positive. They concluded that LMX can impact subordinates' sense of competence and self-determination in a positive or negative way, depending on the relationship of the exchange. If the relationship is open and positive, it is likely to increase the creative outcome of the subordinate.

2.2.3 Individual Creative Ability

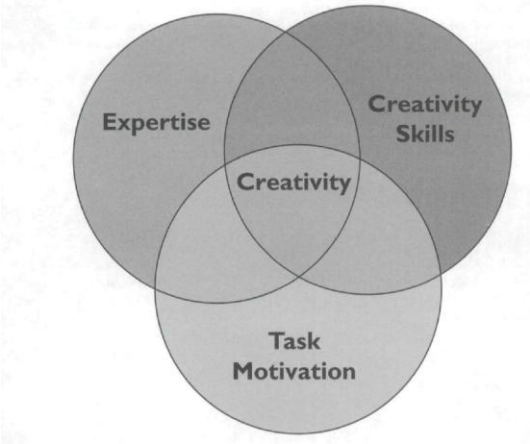
In simple terms, individual creative ability is the capability of an individual to produce ideas that are novel and useful. The creative potential of an individual or individual creativity is very important and must be considered in the discussion of team and organizational creativity. Creativity begins with the individual. If individuals who are "not highly creative" and are not willing to improve their creative potential through training, are placed within a team and an organization with a negative climate towards creativity, it is likely that there will be no or very minimal creative output. Also, a similar logic applies if those same set of individuals are placed within a team and an organization that supports creativity. One cannot expect the creative output to be high in this scenario even if all the organizational support for creativity is evident within the organization (Hargadon and Bechky, 2006; Perry-Smith, 2006; Perry-Smith and Shalley, 2003).

On the other hand, if creative individuals are placed in a team, within an organization that has a negative climate towards creativity, it is likely that there will be very minimal creative output. However, if those individuals are placed in a team, within an organization with a positive climate towards creativity, it is likely that there will be high creative outputs. Hinton (1968) suggested that if the individual's creative output is inhibited by the environment, the individual will not be able to utilize his/or her creative potential. This view is supported by Scott (1965) and George and Zhou (2001).

Studies have found that connections to creative people may help individuals to be more creative (Simonton, 1984; Zhou, 2003). Zhou (2003) found that individuals without the innate ability to be creative improved their creativity due to the presence and potential contact with other persons who are creative. While the individual is the base for all creativity, it is important to note that both team and organizational climate can impact on individual creativity. If an individual who is "not so creative" but is willing to improve his or her creative potential, is placed in a team with a positive climate and an organization that supports creativity, it is likely that his or her creative potential will increase and there will be high creative outcomes.

The Componential Theory of Individual Creativity and Innovation has three major components of individual creativity, each of which is necessary for creativity within any given domain: expertise, creative-thinking skills and intrinsic task motivation (Amabile, 1997). Further, the theory suggests that creativity is most likely to occur when people's skills overlap with their strongest intrinsic interests _ their deepest passions _ and that creativity will be higher, the higher the level of the three components.

Figure 3 - Three Component Model of Creativity



Source: Amabile (1997)

According to Amabile (1997), expertise is the foundation for all creative work. It can be viewed as the set of cognitive pathways that may be followed for solving a given problem or doing a given task and includes memory for factual knowledge, technical proficiency and special talents in the target work domain.

Further, Amabile (1997) describes creative-thinking skills as the component which provides "something extra" of creative performance. The skills of creative-thinking include a cognitive style favorable to taking new perspective on problems, an application of techniques for the exploration of new cognitive pathways and a working style conducive to persistent, energetic pursuit of one's work. She states, "the creative process is, essentially, creative cognitive processing of problems and tasks—that is, all of the cognitive processes that contribute to the production of creative works. Creative cognitive processing consists of several sub-processes:

1. analyzing and articulating the exact nature of the problem to be solved,
2. preparing to solve the problem by gathering information and improving any required skills,
3. generating ideas for solving the problem, testing or validating the chosen solution,
4. and communicating that solution to others" (p. 37).

Amabile (1997) notes that higher levels of each of the four components should lead to more effective creative cognitive processing, which, in turn, should lead to more creative outcomes. Those outcomes can be any observable product, performance, response, or idea, such as a poem, a new software program, a dance, a market research project, a new drug, a training course, a scientific experiment, or a completed consulting engagement.

Moreover, Amabile (1997) notes that primarily, intrinsic task motivation will be more conducive to creativity than a primarily extrinsic task motivation as has been proved by a number of studies (Amabile, 1996; Alencar, 1998, 2001, 2006; Collins and Amabile, 1999; Lewis, 1999). She notes further that a highly intrinsically motivated person is likely to draw skills from other domains, or apply great effort to acquiring necessary skills in the target domain.

Barron and Harrington (1981) identified some traits related to individual creativity which includes: sensitivity to problems; high valuation of aesthetic qualities; broad interests; attraction to complexity; high energy; independence of judgment; autonomy; intuition; self-confidence; playfulness; a creative self-sense and the ability to accommodate apparently opposite or conflicting traits in one's self-concept. Rice (2006) notes that curiosity, persistence, causal reasoning, intellectual honesty, self-direction, stimulation and achievement also play a role.

Woodman and Schoenfeldt (1989) in their model of creative behaviour note that individual creativity is a function of antecedent conditions, cognitive style and ability, personality factors, relevant knowledge, motivation, social influences and contextual influences, while organizational creativity is a function of the creative outputs of its component groups and contextual influences.

Campbell's (1960) evolutionary model of creativity (an evolved strategy in which rules of cognitive development act through the joint inheritance of genetic and cultural information), advocates that creativity is not a baffling process that is done by brilliant individuals only. Campbell advise that an allowance for numerous trial and error and hard work is necessary for creativity. Further, he felt that individuals had to come up with a lot of solutions to difficult problems and tasks, and for this to occur, they needed to employ a wide variety of approaches. Accordingly, Campbell's model focused strongly on variation, in terms of ideas, and also, selective retention of promising ideas and the culling of less desirable ideas.

Simonton (1999) developed an evolutionary theory of creative thinking built on both Darwin's theory of organic evolution and Campbell's (1960) evolutionary model of the creative process. Simonton focused on a process of variation and selective retention. Variation deals with the novelty of ideas, while selection deals with the usefulness of those ideas. As novelty is normally seen as what differentiates creative work over and above useful work, Simonton narrowed his theory on variation. He argued that variation does not need to be blind or random; rather it can be guided by the existence of knowledge elements that can be combined into new variations. The first selection of ideas occurs in the creators' minds, as ideas are tested against relevant criteria for usefulness or appropriateness, as well as using novelty criteria. At some point in time, ideas are shared with other members of the group, and additional variation and selection of ideas can then occur after this point is reached.

Sternberg and Lubart (1991, 1995), suggested an investment theory of creativity, which states that creative thinkers are much similar to good investors. They argue that six resources are available for creativity: intellectual processes, knowledge, intellectual style, personality, motivation and environmental context, with creativity resulting from a combination of each of these elements. Creative thinkers generate ideas that initially are rejected, possibly because they are not popular among the crowd or threaten existing interests.

Reviewing the literature on creativity reveals that there are many factors and determinants that can influence the level of creativity and creative outcomes within organizations to include climate, availability of resources, reward policies and the organizational structure or hierarchy.

2.3 Theoretical Model, Research Questions and Hypotheses

Woodman (1995) notes that "in general, adaptive organizational forms (e.g. matrix, networks, collateral, or parallel structures) increase the odds for creativity. Bureaucratic, mechanistic or rigid structures decrease the probability of organizational creativity" (p. 64). Considerable research has been done that focus on the characteristics of bureaucratic organizations that impede creativity. Studies have found that these structures generally do not have climates that are conducive to creativity. However, within the literature, there are very limited studies that have been conducted to examine the potential and driving forces for creativity within mechanistic structures, especially within a military institution.

Tesluk et al. (1997) note that climate perceptions, at both individual and group level, have been found to be effective predictors of creativity and innovation. Other researchers have also used climate to assess creativity within organizations. By examining the climate perceptions at the ABDF, a determination of the strength of the environment that supports creativity would be able to be gained.

Therefore, research question 1 asks "How supportive is the climate at the ABDF towards organizational creativity?" Based on previous literature review, the main climate factors that will be examined are: supportive/open atmosphere, organizational encouragement, risk-taking, training, workload pressure and output impediment. At the team level, participative safety and support for innovation will be examined which are popular dimensions within the literature on the climate for team creativity. Since team work is highly utilized within military institutions, it is important to examine these variables. Examining the climate for creativity at the ABDF will enable one to know how supportive the climate is towards creativity.

Due to the hierarchical nature of the military, it is necessary to examine where creativity is most emphasized within the organizational hierarchy. This examination will aid in finding out whether creativity is skewed towards the top echelon of the organization or if it is widely spread across the organization as a whole. Therefore, research question 2 which asks "Where is creativity emphasized most within the organizational hierarchy?", will seek to uncover or explore this issue.

As stated earlier, Amabile (1997) notes that an important feature of the Componential Theory is that the work environment influences creativity by influencing the individual components. Hence, since the work environment influences creativity by influencing the individual components of creativity, this research will explore the work environment, the individual components known to affect creativity and their relationship or correlation to creativity. Amabile (1997) further notes that individual creativity requires expertise (knowledge, proficiencies and abilities of people to make creative contributions to their fields), creative-thinking skills (cognitive styles, cognitive strategies and personality variables) and intrinsic task motivation (the desire to work on something because it is interesting, involving, challenging and rewarding). It was confirmed through her studies that the higher the level of expertise, creative-thinking skills and intrinsic task motivation, the higher and better the creativity. Hence, by examining these variables at an individual level, it would enable one to make a determination as to the creative ability of the individual and by extension organizational creativity.

Moreover, Amabile et al. (1996) note, "perhaps the most important lesson for management from the results of our KEYS research is that the perceived work environment does make a difference in the level of creativity in organizations" (p. 1180). Logically, if the perceived work environment makes a difference in the level of creativity in organizations, it follows that the level of creativity in organizations is affected by the perceived work environment. Hence, if the majority of the organization perceive the work environment as completely unsupportive to creativity, (they are not rewarded for producing something new, management does not encourage them, they are not allowed to think outside the box nor deviate from the established rules and procedures) then it might be that they would not be

able to develop their creative abilities and that the level of creativity within the organization will be very low. The creative output may be considered as the amount of new ideas, services, procedures, or processes suggested by individuals and that are implemented within the organization at a given time.

Hence, this research is interested in tools such as KEYS and similar climate instruments to capture how the individuals within the organization perceive the environment for creativity. Hence, if the work environment supports creativity and there is evidence of creative ideas, services, processes and procedures being developed, then one can make a determination as to the level of creativity; it would be high in this case. The same reasoning is applied vice versa. If the work environment undermines creativity and there are no new creative ideas, services, processes, or procedures being implemented, then one can assume that the level will be significantly low.

Therefore, to answer the final research question, "Is a creative work environment related with individual creativity and creative output?", and based on previous literature reviewed by scholars, the following hypotheses are presented:

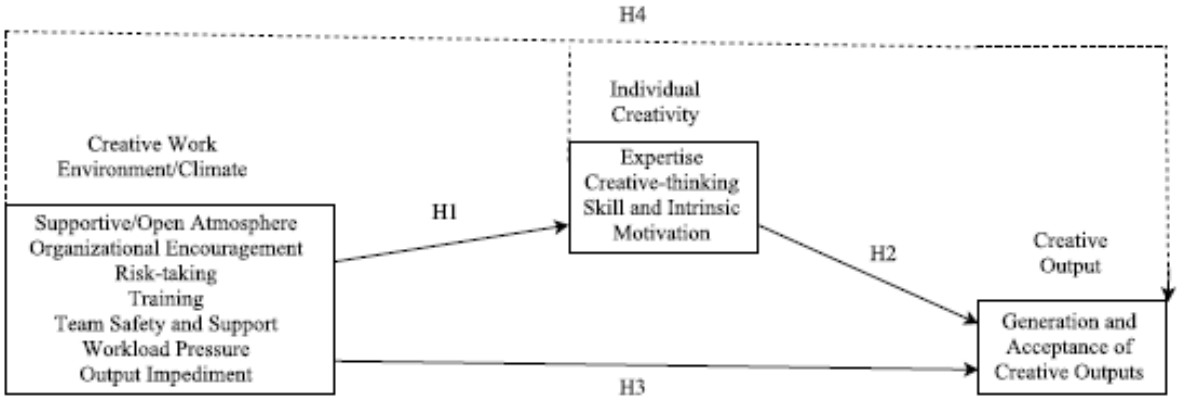
H_1: The perception of a creative work environment or climate is positively related with individual creativity;

H_2: Individual creativity is positively related with creative output;

H_3: The perception of a creative work environment or climate is positively related with creative output;

H_4: The relationship between perceptions of a creative work environment or climate and creative output is mediated by individual creativity.

Figure 4 - Effects of a Creative Work Environment or Climate on Individual Creativity and Creative Output



Source: own

There have not been much studies focusing on the level of creativity within military institutions, addressing the impact and significance. The literature is biased towards emphasizing the characteristics of mechanistic structures that impede creativity, generating a gap in the body of knowledge on the influence of creativity within these very structures themselves. The findings of this research will provide significant insights as to the manifestation of creativity within a military institution.

CHAPTER 3 - METHODOLOGY

3.1 Research Approach

A case study approach was selected for this research as the unit of analysis is within the workplace of the researcher, a military institution. Rowley (2002) states that "case study as a research strategy often emerges as an obvious option for students and other new researchers who are seeking to undertake a modest scale research project based on their workplace or the comparison of a limited number of organizations" (p. 16). Creativity is a complex social phenomena and a case study approach will seek to retain holistic and meaningful characteristics of real-life events. This research method is advocated by Yin (1984) who states that one can generate and test theories via case studies. One of the aims of this research is to test previous research findings on creativity in mechanistic structures. It has often been said that case studies are useful tools to gather data at both the preliminary and exploratory stages of research, and have been viewed as a basis for the development of structured tools that are essential in surveys and experiments (Rowley, 2002). Also, the case study as a strategy may be used to explore those situations in which the intervention being evaluated has no clear, single set of outcomes (Yin, 1984). This research approach can aid in theory generation.

Zhou and Shalley (2008) note that the most direct relevant information in examining creativity in organizations comes from interview and survey studies within corporations. It is through these studies that an understanding of the social environment in organizations and how it might impact creativity was gained. A field study approach was deemed appropriate for this research purpose. Zhou and Shalley (2008) state that most field study approaches to understanding organizational creativity have used data gathered by surveys to assess employees' perceptions of their work environment and to gather personality and demographic data. This research aims at collecting a great majority of the perceptions of the employees at the ABDF, by using a survey approach, about their work environment in order to make a fair assessment of creativity within the institution. This survey approach ensured that the majority of the officers within the organization were given a chance to express their

perceptions of the climate for creativity; hence, it was deemed as the most appropriate method.

3.2 Population and Sampling Method

This study was carried out in Antigua and Barbuda at the Antigua and Barbuda Defence Force (ABDF). Permission was granted by the head of the organization to conduct this study. The data source were officers within the ABDF and the information was collected via primary data collection methods.

The organization is broken down into four departments which are Force Headquarters (FHQ) which had a total of 8 officers, Service and Support Battalion (SSB) which had a total of 62 officers, 1st Antigua and Barbuda Regiment (1ABR) which had a total of 62 officers and Coast Guard (CG) with a total of 61 officers (**see organizational chart in annex 2**). A stratified random sampling was done in proportion to the various departments to ensure that the sample was representative as much as possible of the various departments within the organization.

Within this study, aspects of both a probability and non-probability sampling technique was used in selecting the participants. The sampling frame used was the nominal role of the ABDF which consists of all the enlisted persons and their respective ranks as of 13th January, 2016.

A purposive sampling technique was first used in selecting the sampling units for the survey. The recruits (the newly employed military officers) were excluded from the sampling frame. The rationale was that they were not within the organization long enough (at least a one year period) to provide a fair assessment of the climate or work environment. The total population count for the population of interest was 193 members comprising of 158 males and 35 females. A stratified random sampling technique was then used to select the sample, from 4 strata, namely: FHQ, SSB, 1ABR and CG. This method was chosen to ensure that the sample was representative.

Table 3 - Sample

Department	No. of Males	No. of Females	Total
FHQ	7	1	8
SSB	37	16	53
1ABR	54	4	58
CG	46	10	56
Total	144	31	175

3.3 Data Collection Techniques - Questionnaire

This particular study employed a quantitative data collection technique. A 57 item questionnaire was developed aimed at assessing the climate or work environment for creativity, aspects of individual and team creativity and creative outcomes, based on the frequency of creative ideas and acceptance. The items were developed by reviewing the literature and identifying the relevant concepts that are important to this research. Elements of both the KEYS research by Amabile et al. (1996) and the Situational Outlook Questionnaire (SOQ) by Ekvall (1996) were used. Some of the items were developed by the researcher and this was done in order to complement areas that needed a specific focus in a military context. **Table 4** presents the different constructs and items that were used in this research along with the possible effect on creativity and the relevant authors.

Table 4 - Constructs, Items and Authors

Main Constructs		Items	Effect	Source
Organizational Creativity/Climate	***Organizational Support***	The ABDF supports good or beneficial changes	+	Vego (2013)
		People get recognized or known for coming up with useful new work ideas, services, processes and procedures	+	Amabile et al. (1996)
		People are encouraged to solve problems in new ways	+	"
		Leaders within this organization make it clear that the creation of useful new ideas are highly desired in certain specific areas that are operationally important to the ABDF	+	Plesk and Bevan (2003)
		During my work tasks, I am given a time-period where I can come up with new ideas and solutions	+	Ekvall (1996)
	Supervisor Support	My supervisor supports me	+	Own

	My supervisor provides positive feedback on useful new ideas that I come up with	+	Amabile and Gryskiewicz (1989)
	My supervisor is open or willing to accept useful new ideas	+	"
Freedom/Autonomy	I am able to express or give my opinions on professional matters without being punished for having a different view from my superiors	+	Vego (2013)
	I am given enough freedom or power to decide how to carry out or perform my tasks	+	Amabile et al. (1996)
	I am checked upon to see how well I am completing my task to make sure that I do it the way that the ABDF desires	-	Own
	I have the possibility to decide how to do my work	+	Amabile et al. (1996)
Risk-taking	I am allowed to move away from or differ from any established practice or procedure in order to come up with better solutions	+	Own
	I have solved a problem or completed a task in a different way than was instructed by my superior	+	Own
	I have a careful and low risk attitude in accomplishing my work	-	Amabile et al. (1996)
Challenge	I feel more satisfied with my job when I solve difficult or challenging tasks than solving a simple task or problem	+	Own
	My job brings me important and difficult challenges	+	Own
	I feel challenged by the work I am currently doing	+	Amabile et al. (1996)
Training	The training that I have received has helped me to think in creative ways or different ways	+	Own
	In training, I am given a lot of simulations or fake danger situations, where I have to come up with the best solution to minimize the danger	+	Own
	I am trained to exercise my own judgment about the best response to make when confronted by different types of danger or problems	+	Own
Idea Support	People listen generously or kindly to each other in my workplace	+	Ekvall (1996)
	I feel comfortable with sharing new ideas to my colleagues without being judged or laughed at.	+	Ekvall (1996)
	I am able to actively share ideas across the organization	+	Amabile et al. (1996)
	In an effort to create new ideas, services, procedures and processes, I am allowed to try lots of times and to make mistakes	+	Adapt Campbell (1960)
Trust	In this organization, people feel a sense of trust among co-workers	+	Amabile et al. (1996)
	There is trust in the majority of my relationships at work	+	Ekvall (1996)
Sufficient Resources	Most of the time, I can get the resources I need to conduct my work	+	Amabile et al. (1996)
	My work facility or work space is adequate or enough for me to conduct my duties	+	Amabile and Gryskiewicz (1989)
	I have access to relevant information, equipment and materials to help me generate useful new ideas	+	Amabile and Gryskiewicz (1989)
Workload Pressure	I have too much work to do in too little time	-	Amabile et al. (1996)
	My workload negatively affects my ability to complete my tasks	-	Own
	The tasks that I currently perform requires more time than I am given	-	Own

	Organizational Impediments	I experience a lot of personal and emotional tensions or disagreements with my co-workers	-	Ekvall (1996)
		I find myself in a conflict situation a lot	-	Own
		The level of control placed on me affects my performance in a negative way	-	Own
Team Creativity	***Participative Safety***	When working in a team, people feel understood and accepted by each other within the team	+	West (1990)
		When working in a team or group, everyone's view is listened to even if it is in the minority	+	West (1990)
		People try to control each other in the team	-	West (1990)
	Support for Innovation	Help or assistance in developing or coming up with useful new ideas is available from my team	+	West (1990)
		People in my team co-operate or work together in order to help develop and apply useful new ideas	+	West (1990)
		The members of my team are very supportive	+	West (1990)
Individual Creativity	***Expertise***	I am very knowledgeable of my job	+	Own
		I have the technical skills that are relevant or important for me to carry out my duties	+	Amabile (1997)
		In performing my tasks and duties, I have the necessary talent or innate ability to do so	+	Amabile (1997)
	Creative-thinking Skills	I generate a lot of differing ideas when thinking about topics and issues	+	Williams (2004)
		When faced with unforeseen or surprising situations, I have the ability to react quickly	+	Vego (2013)
		I am able to exercise my own judgment about the best response to make when confronted with different types of problems	+	Adapt Janowitz (1959)
	Intrinsic Motivation	I have the will or drive to solve a problem because it is interesting	+	Amabile (1997)
		I have the will or drive to solve a problem because it is personally challenging	+	Amabile (1997)
		I put in a lot of time to effectively solve a challenging problem	+	Own
Creative Output	***Frequency***	At my job, I come up with useful new solutions, ideas, services, processes or procedures	+	Own
		I suggest new solutions and procedures during my daily routine at work	+	Own
		I share my ideas and solutions about work issues with my colleagues and other members of the organization	+	Own
	Acceptance	I have come up with a useful new solution, idea, service, process or procedure that got accepted within the organization	+	Own
		I have developed a new solution, idea, service, process or procedure that others thought was useful but my supervisor rejected it	-	Own
		I have received awards and/or honours for coming up with new useful solution, idea, service, process or procedure that got accepted within the organization	+	Own

These items were measured via a 5-point Likert scale with 1, 2, 3, 4 and 5 being never, rarely, sometimes, often and always, respectively.

3.3.1 Administration of the Instrument

175 hard copies of the questionnaire were administered to the officers at the ABDF. The various unit commanders or heads were given the questionnaires which were then administered to the officers. The officers were informed of the purpose of the survey and participation in the exercise was encouraged by the head of the organization. The data gathering process took approximately 3 weeks, after which they were returned for analysis.

3.4 Data Analysis Procedures

The Statistical Package for Social Sciences (SPSS) 22 was used in this research for analyzing the data. All of the questionnaires were entered within the software and verification checks were done to ensure that the data was entered correctly. The items that were worded negatively were reverse coded within the software to ensure consistency of the calculated means.

The quantitative data collected was analyzed by performing descriptive statistics, frequency counts, correlation, regression and mediation analyses. These analyses were deemed appropriate in answering the research questions.

3.4.1 Missing Value Adjustments

In conducting any survey, there is always the possibility that there will be unanswered items and responses that invalidate the data such as one person selecting two answers for a particular item or question, or answering in such a way that it is difficult to determine the exact response the individual was trying to make. In cases like these, the items have to be treated or coded as unanswered. SPSS Version 22 has a feature to deal with missing values which was used in this analysis. A total of 63 items, including demographic items, were used for gathering the data and 116 respondents provided answers to these items. Hence, a total of 7,308 single items were generated. 201 out of the total were unanswered which represents a total of 2.75 per cent. Peng, Harwell, Liou and Ehman (2006) note that when more than 20 per cent of missing data is present within a data set, it can cause biases within statistical analyses. None of the columns or rows had more than 20 per cent of missing values; hence, all the data was used within the analysis. Both listwise and pairwise deletion

techniques were used in the analysis. This adjustment for missing values was done in order to minimize bias within the analysis.

3.4.2 Factor Analysis

Performing factor analysis is important in order for a researcher to easily obtain an essential concept by reducing the number of variables into smaller categories to enable sensible or worthwhile interpretations. Rummel (1970) notes that data sets that are especially large, consist of a number of variables that can be reduced through the process of factor analysis, by aggregating common variables into descriptive categories. It was important to conduct the process of factor analysis, as it is simpler to concentrate on some key factors, than having to focus on too many variables that might have little value and can act as distractions in analyzing the data.

Factor analysis was performed on this data set via SPSS Version 22. Principal component analysis and varimax rotation was done on all of the items. The value of 0.4 was set as the critical value for the limit in determining whether an item can be considered to load on a factor. The factors were extracted based on eigenvalues greater than 1. However, a few of the extracted factors did not fit well to be considered a main dimension so a few items were excluded to try to generate a better fit, namely: "often checked upon in doing tasks", "tension and disagreement with co-workers" and "access to resources to conduct work".

The rotated component matrix was used as the researcher concurs with the view of Rummel (1970) that the process is done in order to facilitate better interpretation as unrotated factors are ambiguous. According to Rummel (1970), the overall aim of rotation is to ensure that an optimal simple structure is reached whereby an attempt is made to have each variable load on as few factors as possible, but maximizes the number of high loadings on each variable. Varimax was also used in this analysis, as it is believed that by minimizing the number of variables that have high loadings on each factor and making small loadings even smaller, it makes for better interpretation of the factors, providing a clearer picture (Gorsuch, 1983).

The items selected to measure the climate were analyzed and 8 factors were extracted. The sample adequacy was measured using the Kaiser-Meyer-Olkin (KMO) test which produced a value of .754. It has been generally recommended that the value of KMO should be at least 0.6 (Gray and Kinnear, 2012). See **Table 5** below.

Table 5 - Rotated Component Matrix[a] (Organizational Climate Variables)

Items	Component/Factor							
	1 - Supportive/Open Atmosphere	2 - Workload Pressure	3 - Organizational Encouragement	4 - Risk-taking	5 - Output Impediment	6 - Excluded	7 - Training	8 - Excluded
Support of ABDF to good changes	.669							
Recognition for creativity	.677							
Encouragement for creativity			.489					
Encouragement of leaders to promote creativity in certain areas	.574							
Given time-period for creativity	.416*		.680					
Frequency of supervisor support	.785							
Positive feedback on creativity by supervisor	.796							
Supervisor acceptance of useful new ideas	.788							
Expression of professional views without punishment	.686							
Given freedom to conduct work	.647					.509*		
Granted the possibility to decide on how to work	.699							
Deviation from rules for better solutions	.664							
Did something in a different way than what was instructed				.703				
Careful and low risk attitude				.721				
Satisfied when solving difficult and challenging tasks				.691				
Job brings important and difficult challenges								.820*
Feel challenged by current work							.800*	
Training helped with creative ability			.599*				.432	
Given a lot of simulations to think creative	.431*						.542	
Trained to exercise judgment about best response in dangerous situations						.765*		
People listen generously	.863							
Feel comfortable in sharing new ideas without being judged	.643							
Ability to actively share ideas across the organization	.707							
Allowed to make mistakes and try a lot of time to create new ideas	.638							
Trust among co-workers	.661							
Trust in the majority of working relationships	.711							
Adequate work space						.619*		
Access to information, equipment and materials to aid creativity		-.568*						
Too much work to do in too little time		.767						
Workload negatively affects output					.772			
More time needed to perform tasks		.750						
Frequency of conflict situation				.512*				
Control affects performance in a negative way					.754			

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 11 iterations.

Factor 1 is called **Supportive/Open Atmosphere** and is comprised of 18 items. This factor accounted for 34.75 per cent of the total variance. Two items ("given time-period for creativity" and "given a lot of simulations to think creative") were excluded from this factor, as they had split loadings and loaded higher on factors 3 and 7 respectively. Hence, the 16 items' means were computed to create the scaled variable. This dimension examines to what extent the organization embraces and supports creativity.

Factor 2 is called **Workload Pressure** and has 3 items. This factor accounted for 9.29 per cent of the total variance. The item "access to information, materials and equipment" was excluded from the factor, as it had the least loading and was causing the reliability statistic (Cronbach's Alpha) to not be at an acceptable level. This dimension examines the level of workload and time pressure.

Factor 3 is called **Organizational Encouragement** and 3 items loaded on this factor. 6.37 per cent of the total variance was accounted for by this factor. The item of "training helped with creative ability" was excluded from the factor and kept under factor 7 on which it also loaded slightly lower. This was done to make the factors easily interpretable. This dimension assesses the extent to which the organization has mechanisms in place to enhance or encourage creativity.

Factor 4 is called **Risk-taking** and 4 items loaded on this factor. 5.11 per cent of the total variance was accounted for by this factor. The item of "frequency of conflict situation" which had the lowest loading on this factor was excluded as it was affecting the reliability statistic in a negative way. This dimension assesses the extent to which individuals engage in risk-taking activities.

Factor 5 is called **Output Impediment** and only two items loaded on this factor. This factor accounted for 4.77 per cent of the total variance. This dimension examines the extent to which work output is affected by workload and level of control.

Factor 6 was excluded from the analysis as it was difficult to interpret. The total variance explained by this factor was 3.86 per cent. The reliability statistic was not valid for this

factor as well so it was excluded, as it gave a Cronbach's alpha value of .490, which is unacceptable according to the authors analyzed (Davis, 1964; Nunnally, 1967 and 1978; Kaplan and Saccuzzo, 1982; Murphy and Davidshofer, 1988).

Factor 7 is called **Training** and has 3 items that loaded. It accounted for 3.69 per cent of the total variance. The item "feel challenge by current work" was excluded from the factor, as it was not producing a valid reliability statistic. This dimension examines the impact of training on creativity.

Factor 8 was excluded from the analysis as it only had one item that loaded. The total variance accounted for was 3.33 per cent. The reliability statistic for this factor could not be calculated as it only has one item.

Two factors were extracted from the items that measure **team climate**. The KMO test was .771 which indicates that the sample is adequate. However, since only one item loaded on factor 2, it was excluded as a reliability statistic would not be able to be gained.

Table 6 - Rotated Component Matrix[a] (Team Climate)

Items	Component/Factor	
	1 - Team Safety and Support	2 - Excluded
Understood and accepted by team members	.708	
Views are listened to even if they are in the minority	.789	
Help with creativity available from members within the team	.764	
People co-operate for creativity	.833	
Team members supportiveness	.710	
People try to control each other in the team		.979*

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

The items on both factors loaded highly and independently. Factor 1 which is called **Team Safety and Support**, has 5 items and measures the extent to which individuals feel safe in the work environment to share information and the support that is given to enhance creativity. This factor accounted for 48.76 per cent of the total variance. Factor two was

excluded as there was only one item that loaded and a reliability statistic would not be able to be gained. The factor accounted for 17.74 per cent of the total variance.

Two factors were also extracted from the items that measure **individual creativity**. The KMO test was .823 which indicates that the sample adequacy falls within the acceptable level.

Table 7 - Rotated Component Matrix[a] (Individual Creativity)

Items	Component/Factor	
	1 - Creative-thinking Skills and Intrinsic Motivation	2 - Expertise
Job knowledge		.806
Equipped with technical skills for the job		.763
Have the talent to conduct the job		.810
Generate lots of ideas when thinking on different issues	.529	.409*
React quickly during uncertainty	.621	.528*
Exercise judgment in taking actions when faced with different problems	.810	
Will to solve a problem due to interest	.856	
Will to solve a problem due to its challenges	.792	
Spend a lot of time to solve challenging problems	.809	

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Factor 1 is called **Creative-thinking Skills and Intrinsic Motivation** and measures the extent to which individuals utilize their creative-thinking skills and are intrinsically motivated. Six items loaded on factor 1 in which two had split loadings on factor 2. Since the loadings on factor 1 were higher, they were retained on factor 1. This factor accounted for 54.24 per cent of the total variance.

Correspondingly, Factor 2 which is called **Expertise** was reduced to three items as the two that loaded higher on factor 1 were excluded. This dimension measures the extent to which

individuals have the innate ability necessary to conduct their jobs and the factor accounted for 12.83 per cent of the total variance.

For the items that measure **creative output**, two factors were extracted. The KMO test was .746 which shows that the sample is adequate.

Table 8 - Rotated Component Matrix[a] (Creative Output)

Items	Component/Factor	
	1 - Generation of Creative Output	2 - Acceptance of Creative Output
Generate creative ideas and solutions	.849	
Suggest new solutions and procedures during daily routine	.870	
Share creative ideas and solutions with colleagues	.858	
Generate creative ideas and solutions that got accepted	.612*	.517
Generated creative ideas and solutions that did not get accepted		.579*
Received recognition or award for creativity acceptance		.834

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Two factors were extracted in this analysis. Factor 1 which is called **Generation of Creative Output**, examines the occurrence of creative ideas. This factor has four items that loaded on it and accounted for 48.97 per cent of the total variance. However, the item "generate creative ideas and solutions that got accepted" which also loaded on factor 2 was excluded from under factor 1 and kept on factor 2 as it fits better on factor 2 than on factor 1, even though it loaded higher on factor 1. Excluding it from factor 1 also aids in allowing for a better interpretation. Factor 2 which is called **Acceptance of Creative Output** examines the proportion of creative ideas that got accepted within the organization and has 3 items that loaded. The item of "generate creative ideas and solutions that did not get

accepted" was excluded as it was affecting the reliability statistic in a negative way. Factor 2 accounted for 16.91 per cent of the total variance.

The factor analysis brought the scale down to 46 items. The individual ordinal items that were kept within the factors were then transformed into new scaled variables by computing the means.

3.4.3 Cronbach's Alpha

The overall scale used in gathering the data is reasonably reliable. Majority of the items were generated from a review of the literature with a few developed by the researcher in an effort to relate them to a military context. It has been well documented that Cronbach's alphas with values greater than .5 are acceptable. It must be noted that there are a number of factors that can affect the alpha value and that the acceptance value ranges across different fields.

The alphas ranged from .557 to .945. The dimensions of output impediment and organizational encouragement had the lowest alpha value. It is believed that this is partly due to the fact that there are only two items to measure the dimensions.

Peterson (1994) notes that it is a surprising fact that there is little guidance in the literature as to what is considered acceptable and sufficiently reliable Cronbach's alpha levels for research purposes.

Table 9 - Recommended Cronbach's Reliability Levels

SELECTED RECOMMENDED RELIABILITY LEVELS

Author	Situation	Recommended level
Davis (1964, p. 24)	Prediction for individual	Above .75
	Prediction for group of 25–50	.5
	Prediction for group over 50	Below .5
Kaplan and Saccuzzo (1982, p. 106)	Basic research	.7–.8
	Applied research	.95
Murphy and Davidshofer (1988, p. 89)	Unacceptable level	Below .6
	Low level	.7
	Moderate to high level	.8–.9
	High level	.9
Nunnally (1967, p. 226)	Preliminary research	.5–.6
	Basic research	.8
	Applied research	.9–.95
Nunnally (1978, pp. 245–246)	Preliminary research	.7
	Basic research	.8
	Applied research	.9–.95

Source: Peterson (1994)

Continuing, Peterson (1994) states that of the recommendations in **Table 9**, none of them have an empirical basis, a theoretical justification or an analytical rationale. He states that they seem to reflect either experience or intuition. Examining the table above, Nunnally (1967) first recommended that for preliminary research the acceptable levels should be between .5-.6. However, in 1978, for that same category of research, he changed the threshold to .7, without any explanation.

Table 10 - Dimensions and Reliabilities

Dimension	Cronbach's Alpha	Number of Item
Supportive/Open Atmosphere	.945	16
Workload Pressure	.612	2
Organizational Encouragement	.582	2
Risk-taking	.603	3
Output Impediment	.557	2
Training	.644	2
Team Safety and Support	.819	5
Creative-thinking Skills and Intrinsic Motivation	.883	6
Expertise	.797	3
Creative Output - Generation	.847	3
Creative Output - Acceptance	.672	2

To further assess the reliability of the scale used, all of the variables that measure a particular dimension were aggregated to check for internal consistency. The alphas were .904, .819, .892 and .804 for organizational climate, team climate, individual creativity and creative output respectively. Based on the explanations above, the researcher concludes that the scale is reasonably reliable for this research purpose.

CHAPTER 4 - RESULTS

4.1 Sample Characteristics

Approximately 90 per cent of the total population of interest was targeted. 175 questionnaires were issued with 116 being returned, generating an overall response rate of 66 per cent. 80.9 per cent of the population are male (58.9 per cent of the total male population) while 19.1 per cent of the population are female (62.9 per cent of the total female population) with the modal gender being male. The median and modal age range were 25-34 years while the modal educational level was the secondary level. In terms of rank, the mode was private. Similarly, in terms of examining the mode, the department of CG emerged as the modal department. The median organizational tenure was 7-9 years while the mode was 4-6 years.

Table 11 - Demographic and Professional Characteristics of the Sample (N = 116)

Variable	N	Valid Per cent
Gender		
Male	93	80.9
Female	22	19.1
Age range		
18-24	17	15.2
25-34	61	54.5
35-44	16	14.3
45-54	14	12.5
55-64	4	3.6
Educational level		
Primary	7	6.6
Secondary	69	65.1
Tertiary/College	24	22.6
University (Bachelor and Above)	6	5.7

Rank/position		
Subordinates	86	74.1
Middle Management	15	12.9
Top Management	13	11.2
Department		
SSB	21	18.1
1ABR	42	36.2
CG	45	38.8
FHQ	8	6.9
No. of years employed		
1-3 Years	5	4.5
4-6 Years	35	31.3
7-9 Years	23	20.5
10-15 Years	22	19.6
16-25 Years	14	12.5
26 Years >=	13	11.6

4.2 Perception of the Climate at the ABDF

Six scaled variables were used to assess the perception of organizational climate for creativity at the ABDF. See **Table 12**. The means range from 2.72 to 3.65. Taking an average of the means of the variables, a mean of 3.08 was generated. Evaluating the descriptive statistics of the items that measure this dimension in their ordinal form, revealed that of the 27 items, all, with the exception of 4, had modes of 3. The items with modes of 2 were: "given the freedom to conduct work", "deviation from rules for better solutions", "ability to actively share ideas across the organization" and "trust in the majority of working relationships".

One scaled variable was used to assess the perception of team creative climate. See **Table 12**. The mean for this variable was 3.21. At an ordinal level, the mode was 3 for all the items.

Two scaled variables were used to assess the perception of individual creativity. See **Table 12**. The means for creative-thinking skills and intrinsic motivation and expertise were 3.74 and 4.06 respectively. An average of both means gives a mean value of 3.9. Assessing the ordinal items that were used in assessing this dimension, showed that they had modes of 4 and above with the exception of one ("exercise judgment in taking actions when faced with different problems") which had a mode of 3.

Two scaled variables were used to assess creative outputs. See **Table 12**. The means for both variables were 3.37 and 2.30 for generation of creative output and acceptance of creative output respectively. An average of both means gives a value of 2.84. Examining the items at an ordinal level revealed all had modes of 3 with the exception of "received recognition or award for creativity", which had a mode of 1.

Table 12 - Descriptive Statistics of Main Variables

Descriptive Statistics							
Dimensions	Variables	N	Minimum	Maximum	Mean Listwise	Std. Deviation	Mean Pairwise[2]
Organizational Climate	Supportive/Open Atmosphere	70	1.00	4.81	2.7437	.84036	2.7125
	Workload Pressure	112	1.00	5.00	2.8527	.86898	2.8400
	Organizational Encouragement	111	1.00	5.00	2.7207	.87304	2.7350
	Risk-taking	103	1.67	4.67	3.1133	.53332	3.1233
	Output Impediment	108	1.00	5.00	3.3935	.91726	3.3850
	Training	114	1.00	5.00	3.6535	.89276	3.6350
Team Climate	Team Safety and Support	108	1.20	5.00	3.2074	.74579	3.1840
Individual Creativity	Creative-thinking Skills and Intrinsic Motivation	98	1.33	5.00	3.7381	.78100	3.7200
	Expertise	107	1.33	5.00	4.0592	.77407	4.0360
Creative Output	Generation of Creative Output	110	1.00	5.00	3.3727	.92835	3.3630
	Acceptance of Creative Output	112	1.00	5.00	2.2991	1.05792	2.3050
Valid N (listwise) 51							

4.3 Creativity Within the Organizational Hierarchy

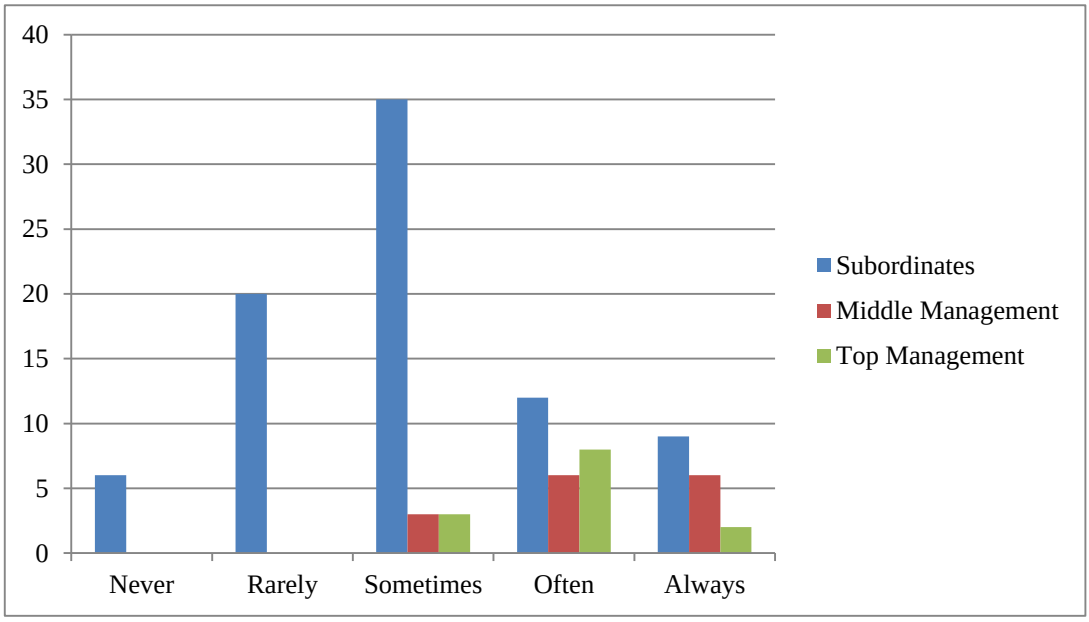
A number of case summaries and contingency table analyses were done in order ascertain where creativity is emphasized most within the organizational hierarchy by assessing the rank in relation to creative output. It is important to note here that, due to a small number of cases in some of the ranks, the ranks of private, lance corporal and corporal are grouped as subordinate rank while those of sergeant, staff sergeant and warrant officer are grouped as middle management, and lieutenant, captain, major, lieutenant colonel and colonel are

[2] In order to ensure that the missing values of N in Table 12, were not significantly affecting the means, the means for the variables that made up the scaled variables were calculated by pairwise deletion manually to ensure that there were no big differences between the means that were calculated by listwise deletion. SPSS uses listwise deletion in calculating descriptive statistics. Examining the pairwise column of Table 12 shows that the means were approximately the same and shows that the adjustment for the missing values did not cause a bias within the means. Throughout the analysis, the means calculated listwise was used.

grouped as top management. The Chi-square test was also done to test for independence of the variables and the results were significant, leading to the rejection of the null hypothesis H_0 and accepting the alternative hypothesis H_1, indicating that there is a statistical relationship between the variables. However, as there were violations in terms of the minimum expected cell count, which can affect the accuracy of the Chi-square statistic, the Fisher test statistic was used which does not have the expected cell count requirement. The Fisher test statistic was significant for all the variables enabling H_1 to be accepted indicating that all the variables have an association.

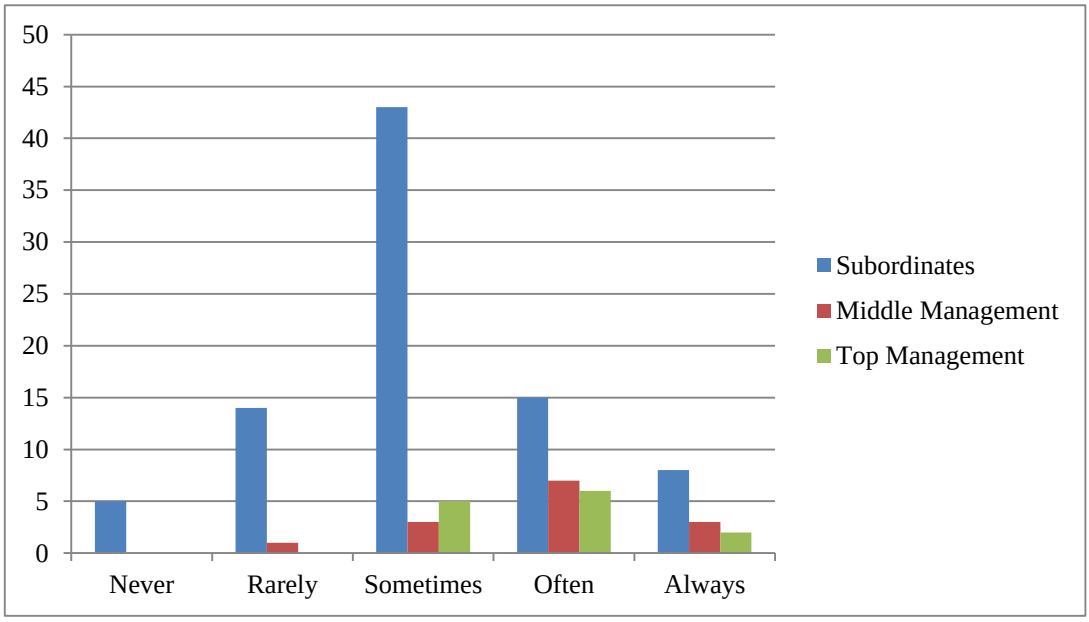
Comparing rank with generate creative ideas and solutions shows that both variables were associated (Fisher test statistic is $p = 0.000$). Examining **Chart 1** shows that only the subordinate rank indicated that they never and rarely generate creative ideas and solutions. 31.7 per cent of the subordinates indicated that they never and rarely generate creative ideas and solutions while 25.6 per cent stated that they often and always do. 42.7 per cent of the subordinate group indicated that they sometimes do generate creative ideas and solutions. 80 per cent of the middle management rank indicated that they often and always generate creative ideas and solutions while only 20 per cent reported that they do so sometimes. In the top management group, 77 per cent indicated that they often and always generate creative ideas and solutions while 23 per cent reported that they sometimes do. Hence, it can be concluded that the majority of the officers within the organization consider themselves to generate creative ideas and solutions at least sometimes which accounts for 76 per cent of the total population. However, in this category, the subordinate group is the group that perceives to generate the least amount of creative ideas and solutions, often and always across the total population. See **annexes 3 to 7** for related frequency tables.

Chart 1 - Rank and Generation of Creative Ideas and Solutions



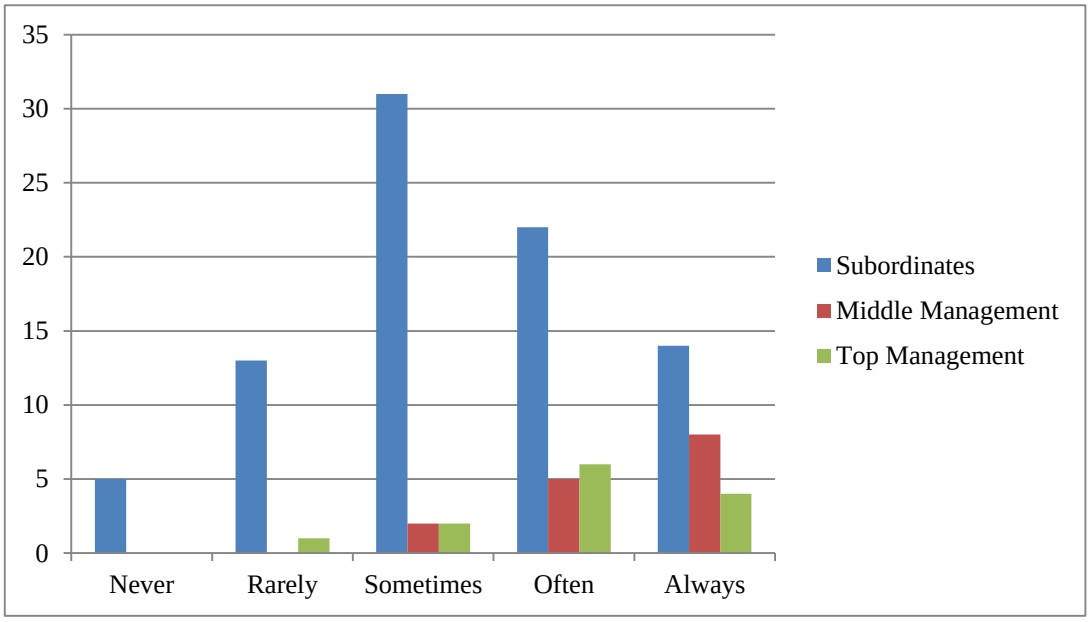
Moreover, analyzing rank with suggesting new solutions and procedures during daily routine revealed that 22 per cent of the subordinate group reported that they never and rarely suggest new solutions and procedures during their daily routine at work, while 27 per cent indicated that they often and always do. 51 per cent of the subordinate group indicated that they sometimes suggest new solutions and procedures during their daily routine. Of the middle management group, 71.43 per cent indicated that they often and always do so while 7.14 per cent indicated that they rarely did. 21.43 per cent of the middle management group indicated that they sometimes do. Within the top management group, 62 per cent indicated that they often and always suggest new solutions and procedures during their daily routine while 38 per cent indicated that they sometimes do. The subordinate group is the least group to often and always suggest new solutions and procedures during their daily routine compared to the middle management and top management groups. Notwithstanding, 82 per cent of the total population indicated that they at least sometimes suggest new solutions and procedures during their daily routine. The Fisher test statistic for the association of these two variables is $p = 0.037$.

Chart 2 - Rank and Suggesting New Solutions and Procedures During Daily Routine



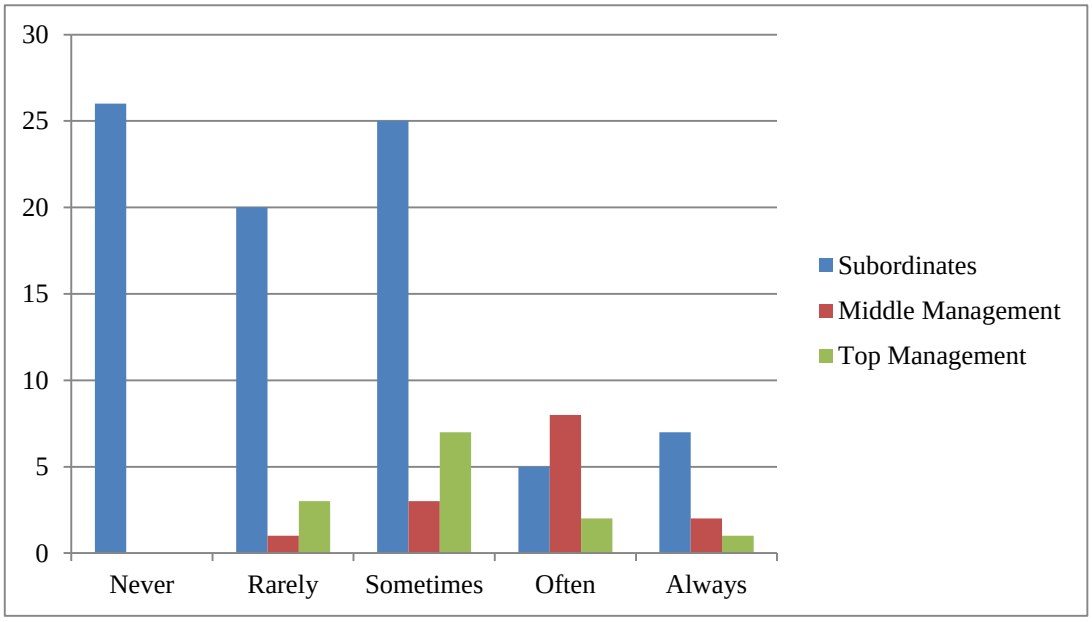
Comparing rank across sharing creative ideas and solutions with colleagues shows that a higher proportion of the subordinate group than any other group, indicated that they never and rarely share creative ideas and solutions with colleagues which represents 16 per cent of the total population count. 42 per cent of the subordinate group indicated that they often and always share creative ideas and solutions with colleagues. Comparatively, there were no reports of the middle management group never and rarely sharing creative ideas and solutions with colleagues while 0.88 per cent of the top management group in relation to the total population count indicated that they never and rarely did. 87 per cent of the middle management group and 77 per cent of the top management group indicated that they often and always share creative ideas and solutions with colleagues respectively. In relation to the total population, 83 per cent indicated that they at least sometimes share creative ideas and solutions with their work colleagues. The Fisher test statistic for these two variables is $p = 0.040$.

Chart 3 - Rank and Sharing Creative Ideas and Solutions with Colleagues



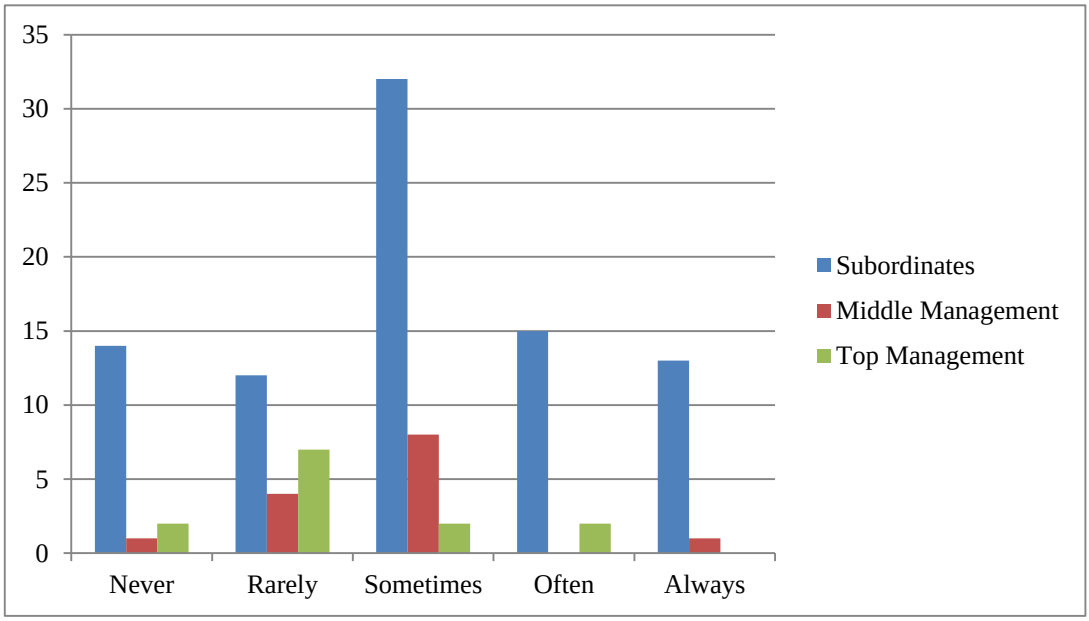
Examining the acceptance of creative ideas and solutions across ranks shows that the subordinate group is the group that has the least acceptance of creative ideas and solutions within the organization. 55.4 per cent indicated that they never and rarely generate creative ideas and solutions that got accepted while 14.5 per cent indicated that they often and always do. 30.1 per cent within the group indicated that they sometimes generate creative ideas and solutions with acceptance. Of the middle management group, 7.14 per cent indicated that they never and rarely generate creative ideas and solutions that got accepted while 71.43 per cent indicated that they often and always do. 21.43 per cent indicated that they sometimes generate creative ideas and solutions with acceptance. Within the top management group, 23 per cent indicated that they never and rarely generate creative ideas and solutions with acceptance while the same proportion (23 per cent) also indicated that they often and always do. 54 per cent indicated that they sometimes generate creative ideas and solutions with acceptance. 55 per cent of the total population indicated that they at least sometimes generate creative ideas and solutions that got accepted within the organization, while 45 per cent indicated that they rarely and never did. A p value of 0.00 was generated for the Fisher test statistic of the association between these two variables.

Chart 4 - Rank and Generation of Creative Ideas and Solutions that got Accepted



Examining the other end of the spectrum, that is, comparing rank with generating creative ideas and solutions that did not get accepted within the organization, revealed that only 33 per cent of the total subordinate group reported that they often and always generate creative ideas and solutions that did not get accepted within the organization. 30 per cent of the subordinate group indicated that they never and rarely generate creative ideas and solutions that were not accepted. Of the middle management group, 36 per cent indicated that they never and rarely generate creative ideas and solutions that were not accepted while within the top management group, 69 per cent indicated that they never and rarely did so. 35 per cent of the total population indicated that they never and rarely did so while 27 per cent indicated that they often and always generate creative ideas and solutions that did not get accepted. The Fisher test statistic is $p = 0.023$.

Chart 5 - Rank and Generation of Creative Ideas and Solutions that did not get Accepted



4.4 Correlation Analysis

The Pearson correlation analysis was used to establish the association between the variables and to determine whether linear regression could be conducted. Gray and Kinnear (2012) note that the Pearson correlation in itself can be highly misleading as a measure of the strength of association and recommend that whenever possible, scatter plots should be examined to verify the strength of the association between two variables. Given only the value of a Pearson correlation, one can say nothing about the true nature of the relationship between the two variables. Gray and Kinnear (2012) provided a case of how the Pearson correlation can be misleading. They cite that "Anscombe (1973) presented some bivariate data sets which illustrate how misleading the value of the Pearson correlation can be. In one set, for instance, the correlation is high, yet the scatterplot shows no association whatsoever; in another, the correlation is zero, but the scatterplot shows a perfect, but nonlinear, association" (p. 405). Scatter plots were generated and examined to verify the goodness of fit. Visually analyzing the scatter plots revealed consistency with the statistics

of the Pearson correlation. The assumptions of normality, linearity and homoscedasticity were checked and no violations were indicated.

According to Cohen (1988), a correlation of less than 0.1 is trivial, a correlation between 0.1 and 0.3 is small, a correlation between 0.3 and 0.5 is medium and a correlation greater than 0.5 is large. See **Table 13** for the results of the correlation analysis of the different variables. The analysis revealed that there is a small negative correlation between gender and the generation of creative output ($r = -.213$ and $p = .026$) and gender and the acceptance of creative output ($r = -.265$ and $p = .005$). Medium positive correlations were found between age range and the generation of creative output ($r = .391$ and $p = .000$) and age range and the acceptance of creative output ($r = .421$ and $p = .000$). Similarly, medium positive correlations were found between rank/position and the generation of creative output ($r = .404$ and $p = .000$) and rank/position and the acceptance of creative output ($r = .305$ and $p = .001$). Medium positive correlations were found between the number of years employed and the generation of creative output and the number of years employed and the acceptance of creative output ($r = .453$ and $p = .000$ and $r = .458$ and $p = .000$ respectively).

The Pearson correlation indicated a strong positive correlation between a supportive/open atmosphere and acceptance of creative output ($r = .629$ and $p = .000$). Similarly, there is a strong positive correlation between a supportive/open atmosphere and the generation of creative output ($r = .504$ and $p = .000$).

Moreover, there was a strong positive correlation between creative-thinking skills and intrinsic motivation and generation of creative output ($r = .648$ and $p = .000$). Also, the results show that there was a strong positive correlation between team safety and support and the acceptance of creative output ($r = .512$ and $p = .000$).

A medium positive correlation was found between organizational encouragement and the acceptance of creative output ($r = .463$ and $p = .000$) and organizational encouragement and the generation of creative output ($r = .400$ and $p = .000$). Likewise, there was a medium positive correlation between team safety and support and the generation of creative output ($r = .428$ and $p = .000$). Creative-thinking skills and intrinsic motivation had a medium

positive correlation with the acceptance of creative output ($r = .313$ and $p = .002$). Expertise correlated positively at the medium level with the generation of creative output ($r = .441$ and $p = .000$). A medium positive correlation was found between the generation of creative output and the acceptance of creative output ($r = .479$ and $p = .000$).

There was a small positive correlation between risk-taking and the generation of creative output ($r = .260$ and $p = .009$). Also, small positive correlations were found between training and the generation of creative output ($r = .271$ and $p = .005$) and training and the acceptance of creative output ($r = .213$ and $p = .025$).

Table 13 - Descriptives and Correlation

No.	Variables	Mean	SD	R	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	**Gender**	1.19	.395	R	1															
2	**Age range**	2.35	1.002	R	-0.015	1														
3	**Educational level**	2.27	.670	R	-0.098	0.310**	1													
4	**Rank/position**	2.81	2.831	R	-0.124	0.732**	0.449**	1												
5	**No. of years employed**	3.39	1.448	R	-0.057	0.809**	0.220*	0.685**	1											
6	**Supportive/Open Atmosphere**	2.7438	.84036	R	-0.144	0.602**	0.183	0.603**	0.716**	1										
7	**Workload Pressure**	2.8527	.86898	R	0.124	0.199*	0.071	0.147	0.198*	0.236	1									
8	**Organizational Encouragement**	2.7207	.87304	R	-0.151	0.393**	0.056	0.367**	0.464**	0.643**	0.221*	1								
9	**Risk-taking**	3.1133	.53332	R	-0.660	0.354**	0.272**	0.338**	0.255*	0.223	-0.079	0.264**	1							
10	**Output Impediment**	3.3935	.91726	R	0.110	0.263**	0.124	0.240*	0.247*	0.268*	0.466**	0.180	0.238*	1						
11	**Training**	3.6535	.89276	R	-0.044	0.228*	0.169	0.301**	0.319**	0.456**	-0.011	0.350**	0.225*	0.012	1					
12	**Team Safety and Support**	3.2074	.74579	R	-0.126	0.283**	0.020	0.276**	0.370**	0.791**	0.079	0.371**	0.195	0.127	0.467**	1				
13	**Creative-thinking Skills and Intrinsic Motivation**	3.7381	.78100	R	-0.067	0.299**	0.158	0.286**	0.343**	0.461**	-0.013	0.265**	0.460**	0.133	0.233*	0.383**	1			
14	**Expertise**	4.0592	.77407	R	-0.052	0.263**	0.105	0.221*	0.296**	0.202	-0.023	0.119	0.330**	-0.012	0.259**	0.307**	0.593**	1		
15	**Generation of Creative Output**	3.3727	.92835	R	-0.213*	0.391**	0.113	0.404**	0.453**	0.504**	0.034	0.400**	0.260**	0.099	0.271**	0.428**	0.648**	0.441**	1	
16	**Acceptance of Creative Output**	2.2991	1.05792	R	-0.265**	0.421**	0.049	0.305**	0.458**	0.629**	0.063	0.463**	0.061	0.061	0.213*	0.512**	0.313**	0.130	0.479**	1

***. Correlation is significant at the 0.05 level (2-tailed).**
****. Correlation is significant at the 0.01 level (2-tailed).**
Gender: 1 = Male, 2 = Female; Age Range: 1 = 18-24, 2 = 25-34, 3 = 35-44, 4 = 45-54, 5 = 55-64, 6 = 65>=; Educational Level: 1 = Primary, 2 = Secondary, 3 = Tertiary/College, 4 = University (Bachelor and Above); Rank: 1 = Private, 2 = Lance Corporal, 3 = Corporal, 4 = Sergeant, 5 = Staff Sergeant, 6 = Warrant Officer, 7 = Officer Cadet, 8 = Lieutenant, 9 = Captain, 10 = Major, 11 = Lieutenant Colonel, 12 = Colonel; No. of years employed: 1 = 1-3 years, 2 = 4-6 years, 3 = 7-9 years, 4 = 10-15 years, 5 = 16-25 years, 6 = 26 years>=; Likert Scale: 1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Always

4.5 Linear Regression and Mediation Analysis

The model that is being tested within this analysis is that of individual creativity as a mediator between the climate for creativity and creative output. In order to accurately test this analysis, the variables for the three main dimensions of climate, individual creativity and creative output were summed to create new variables. Since team climate is a subset of the general organizational climate, it was aggregated at this stage with the other climate variables to produce one variable to assess the climate. The Cronbach's alphas for the aggregate variables of climate, individual creativity and creative output are .926, .892 and .804 respectively.

In order to ensure that regression analysis could be conducted, it was necessary to see if the variables had linear correlations. **Table 14** shows the correlations of the three main dimensions.

Table 14 - Pearson Correlation Coefficient of the Three Main Dimensions

		Climate	Individual Creativity	Creative Output
Climate	Pearson Correlation	1		
	Sig. (2-tailed)			
Individual Creativity	Pearson Correlation	.360**	1	
	Sig. (2-tailed)	.010		
Creative Output	Pearson Correlation	.581**	.570**	1
	Sig. (2-tailed)	.000	.000	

**. Correlation is significant at the 0.01 level (2-tailed).

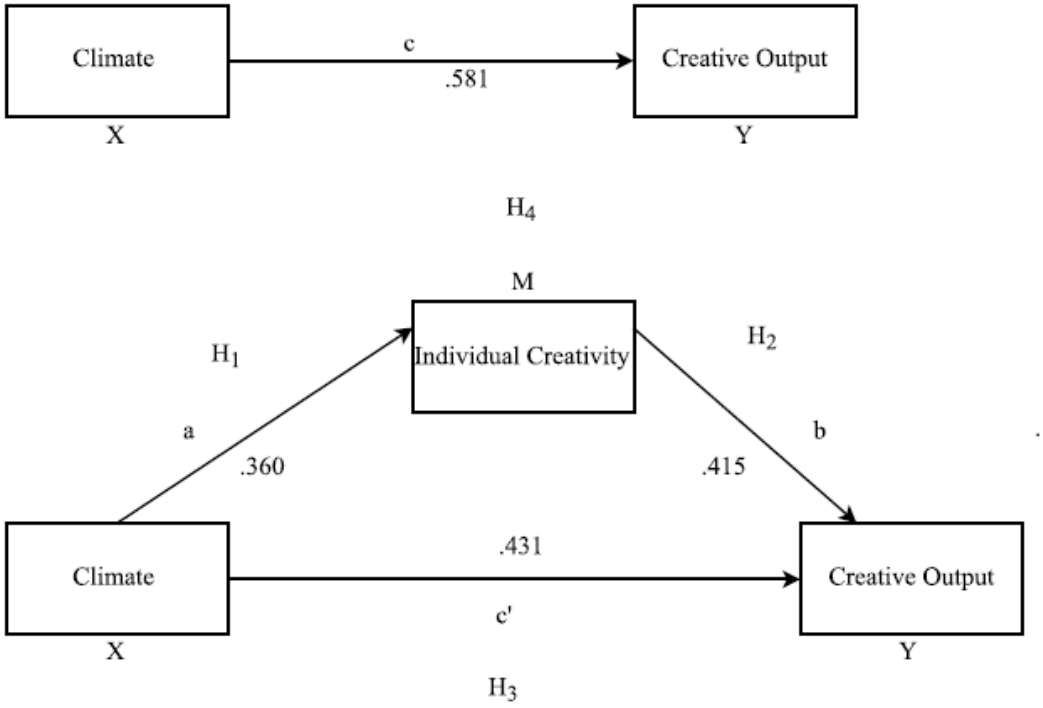
All of the variables produced strong and medium positive correlations which indicate that linear regression analysis can be performed.

The assumptions of normality, linearity and homoscedasticity were checked and no violations were indicated. It is also important to note that the collinearity diagnostics were not violated and there were no identified outliers that could affect the results. These tests or

checks verified that linear regression analysis could be conducted. Three simple linear regression procedures and one multiple linear regression procedure were conducted in order to determine the mediation effect of individual creativity between climate and creative output.

Preacher and Hayes (2008) note that hypotheses of mediation shows how or by what means, an independent variable (X) affects a dependent variable (Y), through one or more latent intervening variables, or mediators (M). The total effect of X on Y can be expressed as the sum of the direct and indirect effects: $c = c' + ab$. Equivalently, c′ is the difference between the total effect of X on Y and the indirect effect of X on Y through M—that is, $c' = c - ab$ (see **Figure 5**).

Figure 5 - Simple Mediation Model



Barron and Kenny (1986) note that variable M is a mediator if X significantly accounts for variability in M, X significantly accounts for variability in Y, M significantly accounts for variability in Y when controlling for X, and the effect of X on Y decreases substantially when M is entered simultaneously with X as a predictor of Y.

Examining **Table 15**, shows that the variable of climate accounted for 11.2 per cent of the variance in individual creativity. This signifies that 11.2 per cent of the variance in individual creativity was explained by climate. For this regression model, the standardized coefficient was 0.360 with a significant level of 0.010 as shown in the table. This shows that there is a positive relationship between climate and individual creativity. Therefore, H_1 is confirmed.

Table 15 - Individual Creativity Regressed on Climate

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Adjusted R Square
		B	Std. Error	Beta			
1	(Constant)	2.708	.444		6.100	.000	.112
	Climate	.389	.144	.360	2.699	.010	

a. Dependent Variable: Individual Creativity

The variable of individual creativity accounted for 31.7 per cent of the variance in creative output, see **Table 16**. This means that 31.7 per cent of the variance in creative output was explained by individual creativity. The standardized coefficient for this model was .570 with a significant value of 0.000 which indicates a positive relationship between individual creativity and creative output. Therefore, H_2 is confirmed.

Table 16 - Creative Output Regressed on Individual Creativity							
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Adjusted R Square
		B	Std. Error	Beta			
1	(Constant)	.266	.426		.624	.534	.317
	Individual Creativity	.696	.108	.570	6.439	.000	
a. Dependent Variable: Creative Output							

Table 17 shows that the variable of climate accounted for 32.5 per cent of the variance in creative output. This means that 32.5 per cent of the variance in creative output was explained by climate. The standardized coefficient for this model was .581 with a significant value of 0.000 which indicates a positive relationship between climate and creative output. Therefore, H_3 is confirmed.

Table 17 - Creative Output Regressed on Climate							
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Adjusted R Square
		B	Std. Error	Beta			
1	(Constant)	.657	.442		1.485	.143	.325
	Climate	.766	.143	.581	5.339	.000	
a. Dependent Variable: Creative Output							

Multiple regression analysis was used to analyze the extent to which climate and individual creativity both explain creative output, see **Table 18**. 46.6 per cent of the variance in creative output was explained by the climate and individual creativity with standardized coefficients of .431 and .415 for climate and individual creativity respectively.

Table 18 - Creative Output Regressed on Climate and Individual Creativity							
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Adjusted R Square
		B	Std. Error	Beta			
1	(Constant)	-.715	.557		-1.284	.205	.466
	Climate	.569	.146	.431	3.895	.000	
	Individual Creativity	.507	.135	.415	3.748	.000	
a. Dependent Variable: Creative Output							

Examining the outputs of tables 15 to 18 shows that they all significantly account for variability of their respective corresponding variables. Also, the effect of climate on creative output decreases substantially when individual creativity was entered simultaneously with climate as a predictor of creative output. In other words, the effect of climate on creative output decreases substantially from a standardized coefficient of .581 to .431, and from a t of 5.339 to 3.895, when individual creativity was entered simultaneously with climate as a predictor of creative output. Hence, examining **Table 18** shows that individual creativity had a slightly lower effect on creative output than climate with t = 3.748 and 3.895 for individual creativity and climate respectively.

A Sobel test was performed to test the effect of mediation that individual creativity had between climate and creative output, see **Table 19**. The test statistic was 2.19 with a p-value of 0.028. **Table 19** also shows the results for the Aronian test and the Goodman tests which are very similar to the results of the Sobel test.

Table 19 - Results of Sobel Test

Test	Equation	Test Statistic:	p-value
Sobel test	$z\text{-value} = a*b/\text{SQRT}(b^2*s_a^2 + a^2*s_b^2)$	2.19	0.028
Aronian test	$z\text{-value} = a*b/\text{SQRT}(b^2*s_a^2 + a^2*s_b^2 + s_a^2*s_b^2)$	2.14	0.032
Goodman test	$z\text{-value} = a*b/\text{SQRT}(b^2*s_a^2 + a^2*s_b^2 - s_a^2*s_b^2)$	2.25	0.025

The reported p-values in these tests are under the assumption of normality of a two-tailed z-test, testing the hypothesis that the mediated effect is equal to zero within the population. The critical values are +/_ 1.96 with a 95 per cent confidence interval. All of the p-values are significant (less than 0.05) which signifies that the null hypothesis is rejected (Reject H_o) and that the mediated effect is not equal to zero within the population. Hence, individual creativity has a mediation effect on climate and creative output (test statistic = 2.19 and p = 0.028).

It can be concluded that there is partial mediation of individual creativity between climate and creative output. Barron and Kenny (1986) note that full mediation occurs when X is no longer significant when controlling for M and that partial mediation occurs when X is still significant with M also being significant in predicting Y. Examining the regression outputs above, all were significant which is a precondition for establishing mediation. However, as both climate and individual creativity were still significant while predicting creative output, it can be concluded that there is partial mediation of individual creativity between climate and creative output. This leads to the acceptance of all the hypotheses of H_1, H_2, H_3 and H_4 respectively, which are:

H_1: The perception of a creative work environment or climate is positively related with individual creativity;

H_2: Individual creativity is positively related with creative output;

H_3: The perception of a creative work environment or climate is positively related with creative output;

H_4: The relationship between perceptions of a creative work environment or climate and creative output is mediated by individual creativity.

CHAPTER 5 - DISCUSSION

5.1 The Climate and Level of Creativity

Evaluating the perceptions of the climate shows that the average person is of the opinion that the climate is reasonably supportive to creativity. The means range from 2.72 to 3.65 while the average of the means of the variables that assess the dimension of organizational climate, was 3.08, corresponding to the midpoint of the range, indicating that the average officer deems the climate as fairly or somewhat supportive.

The items with modes of 2 were: "given the freedom to conduct work", "deviation from rules for better solutions", "ability to actively share ideas across the organization" and "trust in the majority of working relationships". With respect to these items, due to the strict nature of a military institution, it was expected that the modes would be aligned to the left or negative side of the scale. In terms of "given the freedom to conduct work", if officers are given too much freedom in conducting their work, the element of control would be lessened. Within a military organization, control is essential to maintaining law and order and too much freedom can conflict with the maintenance of law and order and discipline. Hence, it can be deduced that management does not allow too much freedom in order to maintain control.

Similarly, "deviation from rules for better solutions" can be seen as an act of disobeying lawful orders. The nature of the military institution is one that does not tolerate disobedience to lawful orders. There is a strong emphasis on following the rules and regulations and punishment is applied to officers who do not conform. This in turn has the effect of ensuring conformance. Hence, it suggests that officers will conform to the rules even if they know deviating from them will generate a better solution. The fear that is instilled by the act of punishment is a likely factor as to why officers do not really deviate from rules for better solutions. The act of not deviating from rules for better solutions, stifles creativity.

Moreover, it is likely that the "ability to actively share ideas across the organization" is affected by the hierarchical nature of the organization. The military follows a strict chain of

command which poses a problem for ideas to be actively shared across the organization. Due to the hierarchical nature and the tall chain of command, information has to be passed successively from one rank to the next rather than across any rank. This can make certain important information be placed on the back burner and some eventually not being reached to the appropriate person responsible for evaluating and acting on the information. Hence, it is likely that vital information is being passed from subordinates that gets stifled along the chain of command, inhibiting creativity in the process.

"Trust in the majority of working relationships" generated a mode of 2 indicating that persons do not feel that there is trust in the majority of working relationships. This could partly be due to the competitive nature and the reward and promotion systems within the military. Competition for rewards within the military can be fierce at times and this fierce competition can diminish trust within working relationships.

The dimension of team climate generated a mean of 3.21 which implies that the average person considers the climate for team creativity at a moderate level. A mode of 3 was generated for all the items that assessed this dimension. The researcher expected that the modes for the items of team climate to be at least 4, as team work is fostered and encouraged within the organization. However, it is likely that not having that much trust in the majority of working relationships has a negative impact on team creativity.

The dimension of individual creativity shows that creative-thinking skills and intrinsic motivation and expertise have means of 3.74 and 4.06 respectively. Both variables imply that the average person considers himself to use creativity relevant traits quite often and often has the expertise to conduct the job. This dimension is very important to creativity as if individuals are not using their creativity relevant traits, it is very likely that creativity within the organization would be very low. The average of both means was 3.9 which is close to the range of "often", indicating that the average person considers him/herself to often use individual creative skills.

The creative output dimension produced means of 3.37 and 2.30 for the generation and acceptance of creative output respectively. This implies that the average person considers

the frequency or generation of creative output to be quite moderate but finds that the acceptance of creative output is quite minimal. An average of both means gives a value of 2.84 which is close to the middle value of the scale (sometimes). Hence, it can be seen that creative output is moderately low within the organization. The item "received recognition or award for creativity" had a mode of 1 which implies that majority of the officers within the institution have not received any kind of recognition nor award for creativity. This can have a negative impact on creativity as it is well documented within the literature that a work environment that rewards persons for creative efforts will encourage or enhance creativity within the organization.

An overall assessment of the climate at the ABDF shows that it is reasonably supportive to creativity. Only a few variables had modes of less than 3 which indicates that the majority of the officers within the ABDF considers the atmosphere of creativity to be moderate. It was found that the climate at the ABDF towards organizational creativity is moderate while the creative outputs are moderately low. Hence, the overall level of creativity within the ABDF can be described as moderate.

The literature review on creativity shows that organizational structures that are bureaucratic, mechanistic, or rigid, tend to have very low levels of creativity while those that are of a matrix form or more organic, tend to foster creativity. Woodman (1995) notes that "in general, adaptive organizational forms (e.g. matrix, networks, collateral, or parallel structures) increase the odds for creativity. Bureaucratic, mechanistic or rigid structures decrease the probability of organizational creativity" (p. 64). While these findings do have some validity, the fact that the level of creativity within the ABDF is moderate shows that bureaucratic organizations, and more so, military institutions, have the potential to and are generating more creative outputs than they are commonly known to produce. However, further research in other military and bureaucratic institutions is needed to establish if there is a trend of increasing creative outputs within these structures. While it is not wise to generalize from one particular case, this particular research work has opened up the avenue for other military and bureaucratic institutions to be examined in order to assess their level of organizational creativity (creative outputs).

Further, Shalley et. al (2000) note that creativity within a work context is likely to occur in any type of work or career or by any employee, once the appropriate conditions for creativity are met. Military, and by extension mechanistic institutions, are believed to have very minimal levels of creativity. The fact that a moderate level of creativity was found at the ABDF, an institution in which it is expected to have very low levels of creativity, shows that once the climate is adequately supportive of creativity, creative outcomes can occur within any institution.

Moreover, Williams (2004) notes that "when inclined and permitted to do so, individuals with routine jobs can think beyond established approaches and think divergently about different methods and outputs, and this creative activity can lead to valuable innovation" (p. 188). Majority of the tasks within the ABDF can be considered as routine, especially amongst the lower echelon of the organization and the moderate level of creativity is an indication that some officers are thinking beyond established approaches and practicing divergent thinking on different methods and outputs. However, to fully capitalize on this aspect, management needs to remove fear and allow for the officers to deviate from the rules for better solutions which will in turn help to improve divergent thinking and by extension, organizational creativity.

While the moderate level of creativity within the ABDF can act as a starting point in examining whether there is a trend towards mechanistic structures embracing more creativity than what has been reported by previous findings, it must be noted that there are changes that can be implemented geared towards improving the climate and by extension the level of creative outputs within the organization. The fact that a moderate level of creativity was found proves that mechanistic structures do have the potential to have better climates and more creative outcomes than what has been reported in past research on creativity in bureaucratic structures.

5.2 The Organizational Hierarchy and Creativity

In terms of generating creative ideas and solutions, it can be said that the majority of personnel considers themselves to generate creative ideas and solutions within the organization. Only within the subordinate group were responses of never and rarely

indicated. Hence, it can be concluded that the majority of the officers within the organization consider themselves to generate creative ideas and solutions at least sometimes which accounts for 76 per cent of the total population.

Moreover, analyzing rank with suggesting new solutions and procedures during daily routine reveals that the majority of the officers within the organization at least sometimes, suggest new solutions and procedures during their daily routine. Only the subordinate group indicated that they never suggest new solutions and procedures during their daily routine, while a mere 7.14 per cent of the middle management group indicated that they rarely do so. 82 per cent of the total population indicated that they at least sometimes suggest new solutions and procedures during their daily routine. Hence, it can be concluded that there is a considerable amount of suggesting new solutions and procedures during one's daily routine.

Comparing rank across sharing creative ideas and solutions with colleagues shows that a moderate amount of the officers share creative ideas and solutions with colleagues at least sometimes. Amongst the three groups, the subordinate group had the highest proportion (16 per cent) of never and rarely doing so. However, in relation to the total population, 83 per cent indicated that they at least sometimes share creative ideas and solutions with their work colleagues. The ideal outcome would have been to have the majority of the persons indicate that they at least often share creative ideas and solutions with colleagues. The element of fear and lack of trust in the majority of working relationships could be considered barriers in the act of sharing creative ideas and solutions with colleagues.

Examining the acceptance of creative ideas and solutions across ranks shows that there is moderate acceptance of creative ideas and solutions within the organization. The middle management group had a higher proportion of acceptance with 71.43 per cent indicating that they often and always do, compared to 23 per cent in the top management group. The subordinate group had the highest proportion of 55.4 per cent in terms of never and rarely generating creative ideas and solutions with acceptance. One would have expected to see that the majority of creative ideas, solutions or procedures that are generated at the top

management level would be accepted within the organization due to the fact that this group is at the top of the chain of command. 55 per cent of the total population indicated that they at least sometimes generate creative ideas and solutions that got accepted within the organization, while 45 per cent indicated that they rarely and never did.

Examining the other end of the spectrum, that is, comparing rank with generating creative ideas and solutions that did not get accepted within the organization, shows that the working atmosphere is one in which creative ideas and solutions are fairly accepted. Only 33 per cent of the total subordinate group (N=86) reported that they often and always generate creative ideas and solutions that did not get accepted within the organization. However, the quality of the ideas and solutions and whether they conflict with established rules and regulations can affect the acceptance.

The results show that the middle management group is the group that generates more creative outputs that are accepted within the organization, followed by top management and then the subordinate group. However, in terms of generate creative ideas and solutions that did not get accepted, the top management group had the highest proportion of not generating creative ideas and solutions with rejection, followed by the middle management group and then the subordinate group. Hence, it can be seen that the middle and top management levels within the organizational hierarchy generate more creative ideas with higher acceptance.

5.3 The Organizational Characteristics and Creativity

There is a small negative correlation between gender and creative output. This indicates that there is a small negative linear association between gender and creative output, towards greater creativity associated with males. Research shows that females are perceived to be less creative than males (Hoff, 2005; Matud, Rodríguez and Grande, 2007; Stolitzfus, Nibbelink, Vredenburg and Thyrum, 2011). Further investigation is needed to see if there is gender bias towards creativity within the organization, given the fact that the ABDF is a male dominated institution. It would be of interest to determine how creative outputs within the organization are treated or handled.

There was a medium positive correlation between age range and creative output. Similarly, medium positive correlations, were found between rank and creative output and the number of years employed and creative output as presented before.

It is likely that as the number of years employed by an individual within an organization increases, creative outcomes will also increase. The fact that there was a medium correlation between the number of years employed and the generation and acceptance of creative output ($r = .453$ and $p = .000$ and $r = .458$ and $p = .000$ for the generation and acceptance of creative outputs respectively), provides motivation for further investigation. The literature on organizational tenure and creativity is very weak and further work is needed in this area. Peng (2016) found that organizational tenure has a weak positive effect on employee innovative behaviour ($r = 0.04$), and status hierarchy, position tenure, culture differences and measurement influence the relationship between the two. The methodological approach of Peng's study was a meta-analysis. The findings of this research showed that the value of r was greater than 0.04 and that a medium correlation was evident. Further, an r of $.517^{**}$ which indicates high correlation, was generated when the variables of generation and acceptance of creative output were aggregated as creative output and correlated with number of years employed within the organization.

This significant finding has opened up an avenue for further research to be conducted within institutions to see if there is indeed at least medium correlations between organizational tenure and creativity and to uncover the factors that might be contributing to this_ whether it is due to increased knowledge, more autonomy and so on. Examining the organizational hierarchy shows that the generation and acceptance of creative output is much more evident across the middle management group, followed by top management group then the subordinate group. It could be that the organizational tenure is playing a role in this finding. Majority of the times and especially within military structures, the middle to upper echelons of the organizational hierarchy tend to have longer organizational tenures. Further investigation is needed to evaluate why this is the case.

5.4 The Relationship Between the Creative Work Environment or Climate, Individual Creativity and Creative Output

The Pearson correlation indicated a strong positive correlation between a supportive and open atmosphere and acceptance of creative output. Likewise, there is a strong positive correlation between a supportive and open atmosphere and the generation of creative output. This shows that there is an association between a supportive and open atmosphere and both the generation and acceptance of creative output. There was a strong positive correlation between creative-thinking skills and intrinsic motivation and generation of creative output. The results show that there is a strong positive correlation between team safety and support and the acceptance of creative output.

A medium positive correlation was found between organizational encouragement and both the generation and the acceptance of creative output. Also, there was a medium positive correlation between team safety and support and the generation of creative output. Creative-thinking skills and intrinsic motivation had a medium positive correlation with the acceptance of creative output while expertise correlated at the medium level with the generation of creative output. A medium positive correlation was found between the generation of creative output and the acceptance of creative output.

The Pearson correlation analysis revealed some important associations between different variables being assessed. It provided substantial support as to the expected correlations among the variables and to what has been documented within the literature. It also allows the acceptance of H_3 as there is indeed a positive relationship between the climate and creative output.

Grouping all the variables into three main variables or dimensions and conducting the Pearson correlation revealed that there was a strong positive correlation between the climate and creative output and individual creativity and creative output. Both these findings conform to what has been reported within the literature on climate. In this research, a medium correlation was found between climate and individual creativity.

5.5 Individual Creativity as a Mediator Between Climate and Creative Output

The results of the mediation analysis shows that individual creativity is a partial mediator between climate and creative output. The findings of the research indicates that the perception of the climate for creativity at the ABDF accounted for 11.2 per cent of the variance in individual creativity while 32.5 per cent of the variance was accounted for by creative output. Climate was seen to be a slightly better predictor of creative output with a beta of .431, followed by individual creativity with a beta of .415.

Hypotheses H_1 through to H_4 were all accepted. There is a positive relationship between the climate and individual creativity; individual creativity is positively related with creative output; there is a positive relationship between the climate and creative output; and individual creativity is found to be a mediator between the climate and creative output.

Partial mediation was found between the climate and creative output with individual creativity as the mediator variable. This finding prompts for further investigation to determine what are the other variables that are also affecting the mediation relationship.

CHAPTER 6 - CONCLUSION

Perceptions of a climate within any organization can affect the level of creativity which has been proven by many studies. The more positive perceptions are there of the climate, the higher the level of creativity and creative output that will be evident within the organization. This study found that the perceptions of the climate were moderate while the creative outputs were moderately low. Moreover, it was found that the perceived climate is positively related with creative outputs.

It was found that the middle and top management group within the organization generated more creative ideas and solutions with a higher acceptance rate than the subordinate level. In relation to the total population, the middle management group is the group that had higher levels of creative output. Overall, it can be concluded that there is a fair amount of generation of creative output by members within the organization which shows that creativity is "alive and active" within the organization. Majority of the individuals within the organization consider themselves to have the necessary expertise and creative-thinking skills that are needed for organizational creativity.

The study showed that individual creativity acts as a partial mediator between climate and creative output enabling the hypothesis of H_4 to be accepted. Further, there was a positive relationship between climate and individual creativity, between individual creativity and creative output and also between climate and creative output, allowing the acceptance of the hypotheses H_1, H_2 and H_3 respectively.

The findings of this research supports the literature in that climate acts as an effective predictor of organizational creativity (Tesluk et al., 1997; Amabile, 1997). It also provides a basis for other research work to be done within other military and mechanistic structures to examine climate and creativity levels as it was found that the climate was moderate and the level of creativity was moderate to slightly low. Majority of the literature on creativity in mechanistic structures show that these structures tend to have very or extremely low levels of creativity. The fact that a moderate level was found at the ABDF provides the basis for further investigations of creativity within mechanistic structures to be carried out.

This research can provide a framework for theory development within the literature on creativity. Evaluating the literature on creativity shows that there is not a consensus in measuring creativity and that various methods are used in assessing creativity within organizations. It must also be noted that what is considered creative in one institution might not be considered as such within another. This research assessed creativity by making a determination through an analysis of the perceived climate and also by examining the perceived level and frequency of creative ideas, solutions, processes and procedures that are generated and accepted within the organization. These two approaches are used in assessing creativity within organizations.

The findings of this study can be used as a benchmark for assessing creativity within other military institutions and mechanistic structures and can aid in theory building. It can also help to re-open up the debate on the very low levels of creativity in mechanistic structures as this particular case proved that creativity within the ABDF is not very low, but moderate. It also provides a basis for further research to be conducted to assess the perceived changes that are taking place in bureaucratic structures in relation to creativity. If similar studies are conducted within other military organizations and mechanistic structures and it is found that they have higher levels of creativity than what was established by past research, it will prove that changes have occurred that are causing these structures to embrace more creativity within their structures.

CHAPTER 7 - IMPLICATIONS

Climate assessments have provided a basis for organizational interventions that have proven useful in enhancing creativity and innovation (Van de Ven, 1986; Schneider et al., 1994 and Basadur, 1997). This research highlights some areas that management needs to consider in order to improve creativity within the organization.

Management needs to make it known that creativity is valued in order to remove the fear of deviating from rules for better solutions. By letting officers know that creativity is wanted can encourage them to deviate from rules for better solutions. Similarly, this reasoning applies to actively sharing ideas across the organization. If this is encouraged, it is likely that creative outcomes will be increased.

The more supportive the climate for creativity, the higher the creativity. Management of the ABDF should try to improve the climate especially by improving the overall support which consists of both organizational and supervisor support. Doing this will likely increase the creative outputs that are generated from within the organization.

The management of the ABDF should place more emphasis on rewarding and recognizing creative efforts which can aid in enhancing creativity. Across the organization, the frequency of rewards and recognition for creative output is very low. Management needs to review their reward policies to enable more rewards and recognition for creative achievements.

As a military organization and by extension a bureaucratic organization, one does not expect for these changes to occur immediately as bureaucratic organizations are slow to change. However, by making these changes incrementally, improvements of creativity within the organization could be seen over time.

CHAPTER 8 - LIMITATIONS

In collecting information via a survey method, there is always the risk that the responses of the individuals may be biased and that some respondents may have been dishonest in their responses to the survey items. The findings are limited to the responses given by the respondents.

Furthermore, in conducting survey research there is always the possibility of having missing values which can affect the analysis and interpretation of the data. There were a few missing values or unanswered items that were within the data set. However, there were no violations as to the rules that govern the treatment of missing values; hence, none of the cases were excluded. It would have been ideal to have less missing values within this data set and for a higher response rate.

Due to time constraint, in depth interviews with officers within the organization was unable to be conducted. Conducting interviews would have provided significant insights that could have unearth some important aspects of creativity that could not have been gathered from the survey data alone, namely the changes that have been introduced and are associated with creativity.

Structural equation modelling (SEM) was not performed on the data set via analysis of moment structures (AMOS). Future studies should conduct such path analysis to examine the relationship between climate, individual creativity and creative output and to examine the independent relationships of the variables all at the same time. The essence of limited time prevented SEM to be carried out in this analysis.

CHAPTER 9 - AREAS FOR FUTURE RESEARCH

Similar research with the addition of qualitative analysis, in other military and bureaucratic institutions needs to be conducted to see if there are better climates now than compared to what has been reported in the findings of past research. This can provide the basis of proving that past research on creativity within these types of structures are becoming antiquated and that current changes within the environment are acting as a motivating force to enable these structures to embrace more creativity.

Similarly, since the level of creativity at the ABDF is moderate, one can investigate the motivations that are causing these mechanistic structures to be generating more creative outputs, whether it is in keeping with the constantly changing environment that we live in today, to increase efficiency and productivity, to be more competitive and so on.

Further research is needed to examine the type of creative outcomes in terms of the quality and the frequency of creative outputs generated over a specific period of time. For bureaucratic organizations, future studies should focus on the length of time it takes for these creative outcomes to occur.

Research work in needed to answer these questions: What factors contribute to creative outputs being accepted or not within these mechanistic structures? Is it due to the quality of the creative outputs; is the hierarchical nature stifling creativity from the subordinate level; is favoritism having an impact on the acceptance of creative outputs? Further investigations could be carried out to find out which departments are more creative and whether the different functions of the departments are affecting the generation and acceptance of creative outputs.

A correlation analysis between gender and creative output shows that there is a small negative correlation between the two. Because the female population within the ABDF is small, it would be interesting to know if there is gender bias towards creativity and to find out what are the underlying factors that are causing it, if that is the case, so that

improvements can be made to leverage creativity across the organization as a whole. Observations and longitudinal studies could be done to unearth this.

Organizational tenure and creativity should be investigated to know if over the years, the knowledge and experience gained by officers within the organization has a positive impact on creativity. Peng (2016), in his work noted that further research should be conducted to examine more contextual factors that influence the relationship between organizational tenure and innovative behaviour. Conducting this research will also allow a determination as to whether other institutions have stronger positive relationships between organizational tenure and creativity than what was found in Peng's study.

Partial mediation was found in terms of individual creativity being a mediator between climate and creative output. According to Preacher and Kelly (forthcoming), when there is partial mediation between variables, there is the implication that other indirect effects could and probably should be investigated further empirically, to identify the other variables that are also affecting the relationship. They further note that such an investigation can aid in theory building and that conclusions of partial and full mediation can have significant implications for theory building as they suggest the plausibility of additional mechanisms. Practically, partial versus full mediation might be viewed as an indication of the importance of an intermediate variable in explaining the total effect (Preacher and Kelly, forthcoming). Further investigation is needed to identify the variables that are affecting the relationship as partial mediation was found.

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ANNEXES

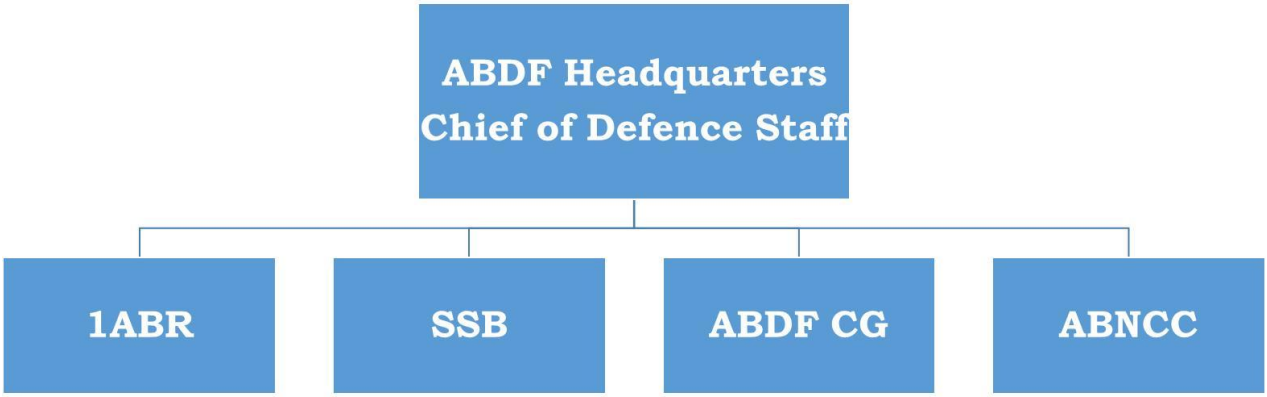
Annex 1 - Brief Description of the ABDF

The Antigua and Barbuda Defence Force is a military organization located in St. George's, Antigua. It was established on the 31st August, 1981 and is structured similarly to a very small infantry Brigade comprising of four departments, namely: Service and Support Battalion (SSB), 1st Antigua and Barbuda Regiment (1ABR), the ABDF (CG) and the Antigua and Barbuda National Cadet Corps (ABNCC) all under the leadership of Force Headquarters (FHQ). The Force is headed by Sir Colonel Trevor A. Thomas who holds the title of Chief of Defence Staff and at the time of the study, 224 officers were enlisted within the institution. The responsibilities of the ABDF include defending the country, maintaining law and order, protection of economic zone and providing assistance to the community especially in times of either natural or man-made disasters.

The vision of the ABDF is "a professional defence force capable of addressing threats to national peace and stability, participating in community development, protecting national interests and contributing to hemispheric stability". Its mission is "to defend Antigua and Barbuda's territorial integrity and sovereignty to include, aid to the civil authority, fisheries protection, drug interdiction, and humanitarian relief operations, and to promote regional peace".

FHQ is responsible for administration. SSB is the unit tasked with the responsibility of supplying the 'life-blood' to the Force. It provides logistics and maintenance support to allow the other units to effectively execute their respective missions. 1ABR is the fighting unit of the ABDF. CG functions include conducting maritime safety, defence readiness and naval duties, maritime law enforcements, search and rescue operations and nation building. The ABNCC is a voluntary youth organization, sponsored by the Government and People of Antigua and Barbuda that acquires its membership from secondary (high) schools. The main objective of this unit is to provide training and personal development to the youths through military and paramilitary activities and community service.

Annex 2 - Organizational Chart of the ABDF



Annex 3 - Frequency Table of Rank and Generation of Creative Ideas and Solutions

Rank	Never	Rarely	Sometimes	Often	Always	Total
Subordinates	6	20	35	12	9	82
Middle Management	0	0	3	6	6	15
Top Management	0	0	3	8	2	13
Total	6	20	41	26	17	110

Annex 4 - Frequency Table of Rank and Suggesting New Solutions and Procedures During Daily Routine

Rank	Never	Rarely	Sometimes	Often	Always	Total
Subordinates	5	14	43	15	8	85
Middle Management	0	1	3	7	3	14
Top Management	0	0	5	6	2	13
Total	5	15	51	28	13	112

Annex 5 - Frequency Table of Rank and Sharing Creative Ideas and Solutions with Colleagues

Rank	Never	Rarely	Sometimes	Often	Always	Total
Subordinates	5	13	31	22	14	85
Middle Management	0	0	2	5	8	15
Top Management	0	1	2	6	4	13
Total	5	14	35	33	26	113

Annex 6 - Frequency Table of Rank and Generation of Creative Ideas and Solutions that got Accepted

Rank	Never	Rarely	Sometimes	Often	Always	Total
Subordinates	26	20	25	5	7	83
Middle Management	0	1	3	8	2	14
Top Management	0	3	7	2	1	13
Total	26	24	35	15	10	110

Annex 7 - Frequency Table of Rank and Generation of Creative Ideas and Solutions that did not get Accepted

Rank	Never	Rarely	Sometimes	Often	Always	Total
Subordinates	14	12	32	15	13	86
Middle Management	1	4	8	0	1	14
Top Management	2	7	2	2	0	13
Total	17	23	42	17	14	113

Annex 8 - Permission for Using the Institution in the Case Study

Universitary Residence World Spru
Rua do Monte da Estação - Porta B
Porto Campanhã
4300-342 Porto
Portugal

19th October, 2015

Colonel Sir Trevor A. Thomas
Chief of Defence Staff
Antigua & Barbuda Defence Force
Camp Blizard
Coolidge
St. George's
Antigua

Request for Permission to use the Antigua and Barbuda Defence Force as Part of my Dissertation

Dear Sir,

I am formally requesting your permission to use the ABDF as part of my masters dissertation. As you are aware, I am currently studying at the University of Porto (FEP) and I must complete a dissertation at the end of the program. Having worked at the Institution for over 12 years, and interacting on a day to day basis with officers at all levels, I was motivated to conduct my study based on the ABDF.

My topic is **"Creativity in Military Institutions, its Impact and Significance - Case of the Antigua and Barbuda Defence Force"**.

My method of data collection will be questionnaires and interviews. I will conduct the interviews myself and I will have someone assist me in distributing the questionnaires.

Also, I hereby request permission to use the two most recent ABDF's Paratus magazines within my work.

I hereby declare that the information collected is solely for the use of this research and that all the information and data will be strictly confidential.

Kindly acknowledge your approval by signing on this document.

Sincerely,

Chief of Defence Staff
Antigua Barbuda
Defence Force

S. Jackson

Shereka Jackson
Assistant Secretary (B.Sc hons)